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AMERICAN GAS JOURNAL

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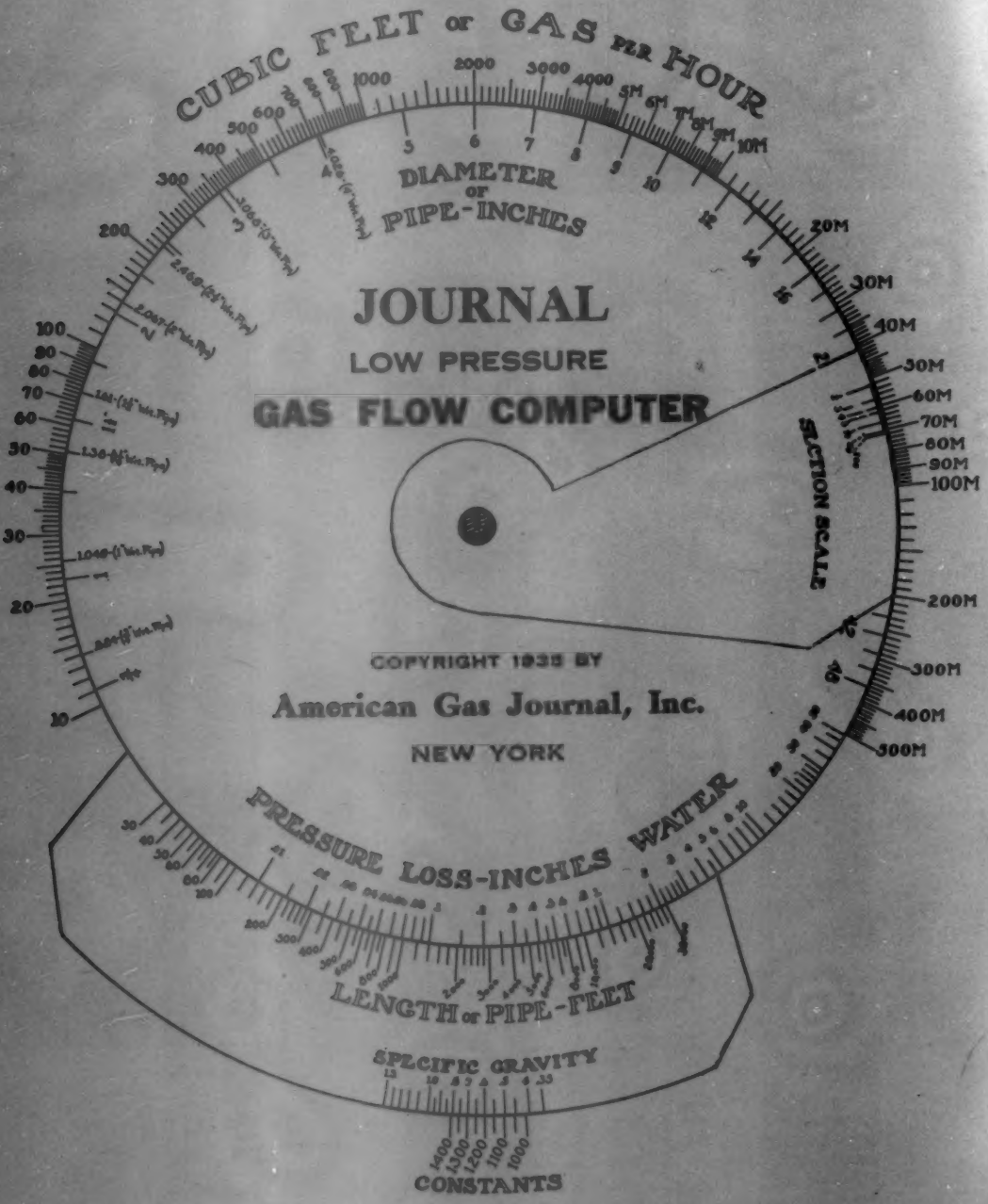
200 South Second Street, Elizabeth, N. J. 3154 South California Ave., Chicago, Ill.

An American Enterprise Using American Materials and Employing American Labor

NEW IMPROVED COMPUTER

FOR LOW PRESSURE



Price $2.50 each

American Gas Journal, 53 Park Place, New York

AMERICAN GAS JOURNAL

Established 1859

JULY 1935

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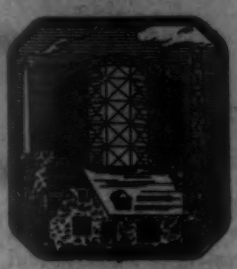

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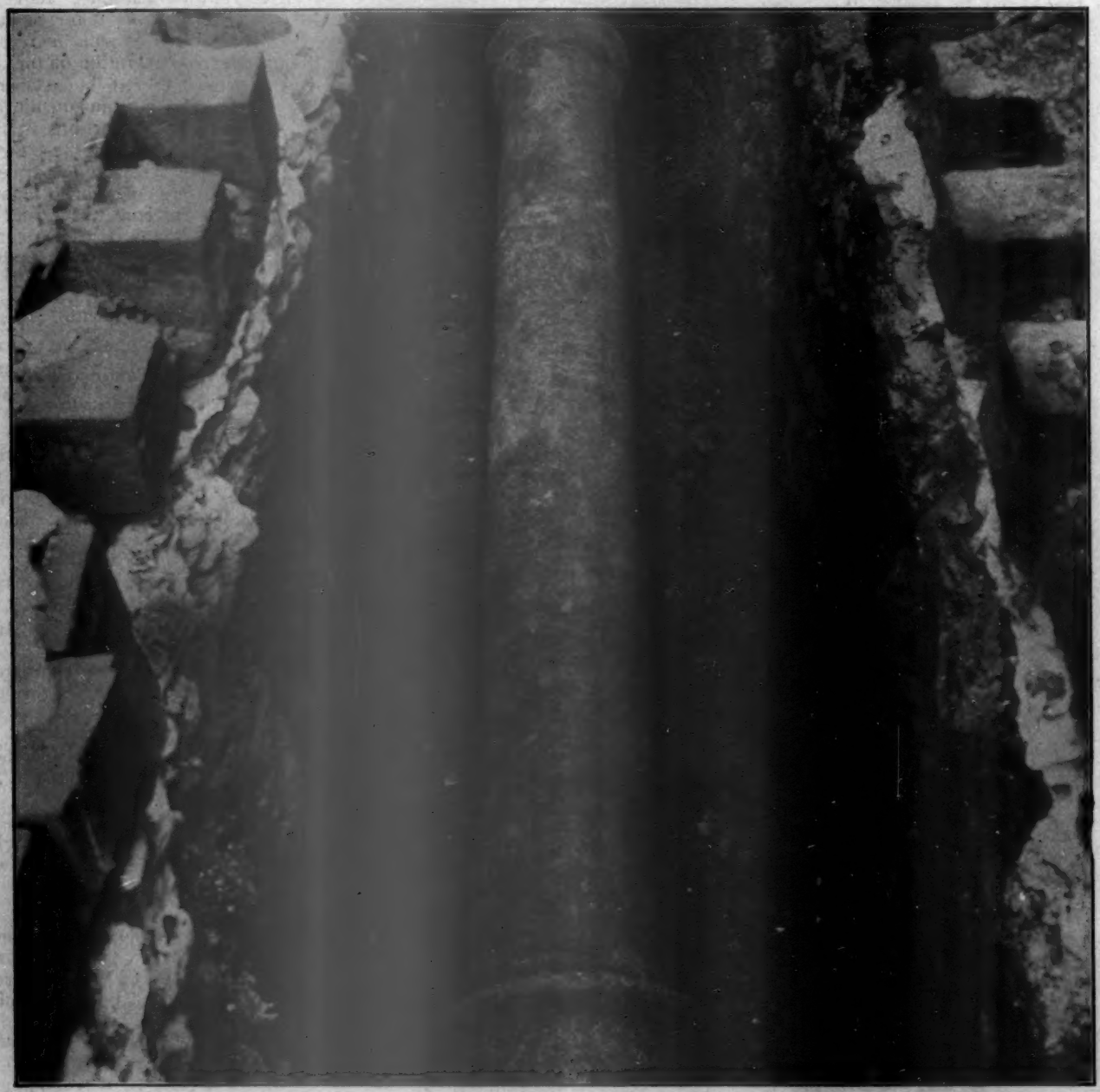
A century old—made of cast iron the standard material for gas distribution mains



● **Visible evidence of the long life of cast iron gas mains is this photograph of an exposed 10" pipe, part of Philadelphia's first gas distribution system, installed in 1835 and still in service. Cast iron pipe as made today with gas-tight mechanical joints and with improved standards of metallurgical control is an even finer product for gas service than the long-lived pipe of a century ago. The Cast Iron Pipe Research Association, Thos. F. Wolfe, Research Engineer, 1015 Peoples Gas Building, Chicago.**

AS THE EDITOR SEES IT

The Objective Rate Plan

ONCE again the Objective Rate Plan is to the fore.

The Department of Public Utilities of the State of Arkansas, on June 8, 1935, issued an order fixing a date for a hearing "at which all public utilities rendering electric service in this State shall appear and show cause, if any they have, why (an objective rate) plan (such as that outlined by the Commission) or some modification thereof should not be made effective." This order, printed in full elsewhere in this issue of the Journal, sets forth with commendable clearness the purpose and application of the objective type of rate, and meets squarely the contention of some that it is discriminatory.

In Wisconsin an important group of electric properties recently filed an objective rate plan with the Commission, evidently in compliance with the views expressed by the latter in its order of January 26, 1935, requiring all electric utilities to show cause why they should not be obliged to adopt such plans. An interesting feature of the one recently filed is the provision that the objective rate shall be automatically adjusted to compensate for changes in (1) the cost of fuel, (2) the cost of labor and (3) taxes.

In North Carolina the gas properties managed by the National Public Utilities System, on June 1, 1935, put into effect an obective rate plan which is unique in that **the objective rate is expressed in "Kilowatt-Hour Equivalents."**

It is a matter of real significance to find gas companies beginning to adopt objective rate plans. Thus far these have found their widest acceptance in the electric industry, and have come to be associated with that industry even in the minds of the regulating authorities. Mr. F. A. Newton, writing in the May 1935, issue of The Journal of Land & Public Utility Economics, gives an impressive list of electric utilities which have adopted these rate plans. In some cases they bear such names as "Free Electricity Plan," "Additional Use Rate" or "Inducement Rate," but they are all in fact of the objective type. In the gas industry, on the other hand, we know of only the following: (1) The "Free Gas" plan of Florida Public Service Company, (2) "Share the Benefits" plan of the Connecticut Power Company subsidiaries in New London and Stamford, (3) the "Customers Index Rate" of the Mahanoy City (Pa.) Gas Company and (4) the recently adopted "Inducement Rate" of the North Carolina properties mentioned above. If such plans are good and are applicable to gas companies let us adopt them wherever opportunity affords; if they are not beneficial let us definitely reject them; but at all events let us give them prompt and thorough study.

At various times during the past six months we have commented on objective rate plans that have appeared under other names. We have pointed out that their purpose is to strengthen the competitive position of the company by transferring the customers from their existing level of use and existing rates to a new and higher level of use at new and far lower rates, at the same time protecting the financial integrity of the company. To what extent have they succeeded?

In the article by Mr. Newton mentioned above it is shown that the sales of electricity per domestic customer of Tennessee Electric Power Company increased 26 per cent during the first year of operation of the objective rate plan. In territory served by Alabama Power Company and Georgia Power Company the increase was about 10 per cent. The reductions in the average price paid by domestic customers in these three territories were 28 per cent, 17 per cent and 22 per cent respectively. The three companies mentioned above were the first to adopt rates of the objective type. In most other cases it is still a little early to obtain comparative figures; but such rates are unquestionably highly promotional.

Having been introduced by an electric utility it was natural that the early development of objective rates should be in that field, especially as actual or threatened government competition spurred the power industry to find ways to meet it. But the gas industry also faces the keenest sort of competition, and whatever will help to meet it should be welcomed.

The objective rate plan has for its basis the well recognized fact that the cost per unit of service of an increment or additional load is far less than that of the existing or base load. In the electric industry the incremental cost is particularly low. In the gas business it is higher. While experience may show, therefore, that it may be desirable to modify the objective rate plan used by the power companies to suit our purposes the fundamental principles applicable to the one industry should also be applicable to the other.

With respect to the alleged discriminatory character of objective rate plans, the Alabama Public Service Commission has aptly said:

> "It may be charged that under this plan some discrimination will result in favor of the present small user. If there is any basis for such view, our answer is that such condition will be temporary, and when all the facts and circumstances are considered, that this discrimination, if it exists, will not constitute an unjust discrimination."

Once again we urge that the gas industry make a prompt and thorough study of objective rate plans. It needs every available weapon to fight the competition with which it is faced.

Truth in Advertising

"Juicier, Larger Roasts. No flame to dry out oven air; no flue carries off evaporated juices. A 4-lb. roast can provide as much meat as 5-lbs. cooked by old methods."

This is the caption of an advertisement by a reputable manufacturer of electric ranges in the July, 1935, issue of McCall's Magazine. **"Truth in Advertising:** McCall's Magazine will not knowingly insert advertisements from other than reliable firms." In those words is its policy stated. We are confident, however, that had it investigated the truth of the above advertisement it would have found the following:

There is no difference in shrinkage of meat whether cooked electrically or by other methods when the condi-

tions are alike. Identical paired roasts of meat—the same cut from the two different sides of same animal, cooked at the same temperatures, to exactly the same internal temperature, will show practically the same percentage of shrinkage whether cooked in an electric or other type of stove. From the meat shrinkage work which has been done in various schools and colleges throughout the country, the conclusion has been reached that shrinkage is dependent upon such factors as the cut, its size, shape, amount and distribution of fat, amount of bone, kind of pan in which it is cooked, temperature at which the meat is cooked, and the degree to which it is cooked.

"No flame to dry out oven air." Clearly this advertisement is aimed at the dreaded competitor—the gas range. Coming down to earth from the realm of fancy, we find that many of the meat shrinkage tests by unprejudiced authorities have indicated actual superiority of the gas oven over the electric. In any event we have been unable to find reference from any reliable, unprejudiced source indicating in any single case a superiority of the electric over the gas range oven even approximating that claimed in the advertisement.

We feel that the manufacturers of gas ranges, the dealers who sell them and the gas companies should join in demanding that the truth of this advertisement and all similar advertisements be definitely proved or else that due steps be taken to force retraction of the statements. We doubt whether the electric range manufacturers will even try to support their claims by unbiased evidence.

Perhaps effort will be made to "crawl out from under" on the ground that a comparison with "old methods" was specified. Well, then, compare a gas range with a quarter of a century of honorable service to its credit with an electric range of equal age. (We smile at the thought.) Or let us take an up-to-date gas range for comparison with a present day electric range.

Whatever explanation may be forthcoming, we are confident, that the average reader would interpret the advertisement as a claim that a four pound roast cooked in an electric range oven would feed as many people as a five pound roast cooked in the oven of a gas range, coal range or oil stove. *Truth in advertising!* We frankly have no basis for believing that this is the truth.

One reasonable explanation, and only one, occurs to us. A roast cooked in a modern, thermostatically controlled, ventilated gas range oven may be so tender, juicy and palatable that the family will eat twenty-five per cent more than if cooked in an electric oven. Is that the explanation? Really, it is the only logical one we can think of. If that is what was meant, we apologize and withdraw our criticism of the advertisement.

The TVA Yardstick

THE TVA has been touted throughout the land as the yardstick by which the reasonableness of electric rates is going to be measured. The construction of a measuring instrument is a task which one would expect to be pursued with the utmost care, honesty and attention to accuracy.

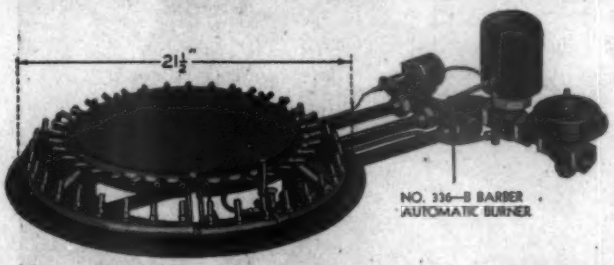
The present law requires the Comptroller General of the United States to audit the transactions of the TVA at least once each year. His recent report on this project reveals financial irregularities and a disregard for legal requirements. As quoted to the Senate by Senator Austin of Vermont, his report is in part as follows:

"The nature of exceptions established consists of purchases without competition, in violation of Section 3709 of the Revised Statutes; emergency purchases unsupported by showing of emergency; modifications of specifications; awards on basis of personal preference; dual compensation; excessive allowances and reimbursement of traveling expenses to prospective employees; payment of per diem at designated posts of duty; allowance of overtime to annual employees; allowance of charge for personally-owned motor vehicles without prior authorization; overpayment on pay rolls; payment of pay rolls without administrative approval; subscription to newspapers and periodicals in excess of statutory limitations; payment for rented office equipment lost or stolen; payment for power plants, transmission lines, and real estate acquired without having clear title thereto; rent for land occupied by Civilian Conservation Corps camps paid at rates higher than for land purchased outright; lump-sum payments under cost-plus contracts and fees without original invoices and in excess of reported progress of work; claims paid for less and damage to property; apparent overpayments on electric equipment under annual agreements; cost of reconditioning plant agreed by contract to be for payment account of losses; rent for buildings without evidence showing that payments are not in excess of 15 per cent of fair market value; pre-audited certified vouchers increased and payments made to vendors in excess of amounts shown on the invoices; allowances in expense accounts for bridge toll tickets before such books have been used; loans to cooperative associations without security; hire of special conveyances, such as busses and airplances, for visitors and students; and non-compliance with contractual provisions for insurance protection covering personal injury."

The Comptroller General's report further shows that properties transferred to TVA at the time of its establishment represented a net cost of $132,792,294.03; but this amount was scaled down on the TVA books to $51,000,000. The value of the Wilson Dam and plant has been similarly scaled down. Then, "despite the apparently excessive depreciated value at which the Muscle Shoals property was taken over on the books" the depreciation reserve being set up, according to the Comptroller General, "appears to be entirely inadequate."

Encouraging and enheartening is it indeed to find another government official in high position to be added to that little group which irrespective of party, still holds to the principles of democracy, the constitution and true statesmanship, and believes that a yardstick, whether made by an individual or the government, should be straight and should be 36 inches long.

On Your "Difficult Jobs"—
Use BARBER BURNERS!



SPECIFICATIONS, not advertising superlatives, make conversion burners SELL and STAY SOLD. Compare Barber design, construction and performance record with those of any other gas conversion burner on the market.

Tailor-made to suit and fit the grate dimensions of round or oblong furnaces or boilers. Insure proper scrubbing flame action on side walls of firebox. Equipped with Baltimore or Klixon Safety Pilot for positive and accurate control. Listed in the A. G. A. Directory of Approved Appliances.

Write today for New Illustrated Descriptive Bulletin and Revised Prices.

The Barber Gas Burner Co.
3704 Superior Ave. Cleveland, O.

BARBER *Automatic* JET GAS BURNERS

● for Warm Air Furnaces, Steam and Hot Water Boilers ●

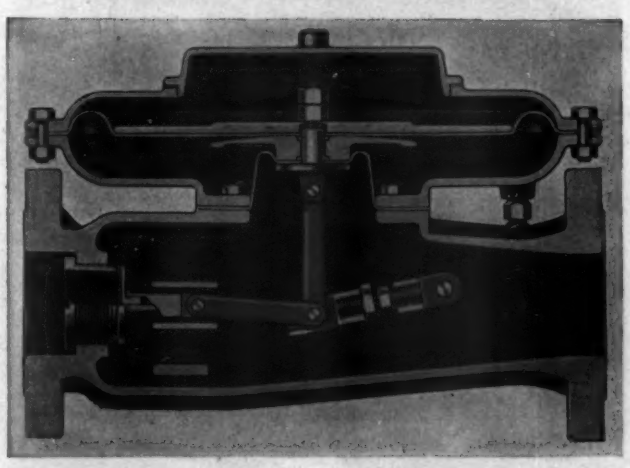
HIGH PRESSURE **GAS HOLDERS** LOW PRESSURE

PURIFIERS · TANKS · CONDENSERS
STEEL PLATE CONSTRUCTION

INTEGRITY GOOD WORKMANSHIP FAIR DEALING

CRUSE-KEMPER CO.
AMBLER, PA.

Performance

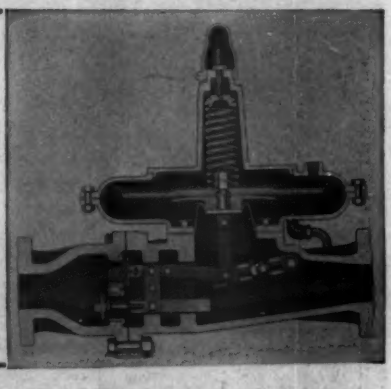


REYNOLDS Toggle Type Regulators for industrial Gas Control, proved by performance in actual operation, guarantee smooth, constant outlet pressure and volume even though inlet pressure and volume are decidedly jumpy. Some of their outstanding features are: Removable Valve Pocket and Orifices; Side Hand Holes; Streamlining that directs the flow of Gas, increasing capacity and range; pressure reduction* from pounds to pounds and pounds to inches W. C.; single or double valve construction; spring or dead weight type adjustment and equipped with or without pilot control.

*Body of Regulator is so machined that a pounds to pounds diaphragm casing, or a pounds to inches W. C., diaphragm casing may be used or interchanged. Also equipped with removable inlet spool with orifices which permits installation of various sizes of orifices while Regulator is in pipe line.

ABOVE—
Cross-section view—
REYNOLDS
Dead Weight—
Single Balanced Valve,
Toggle Type Regulator

AT THE RIGHT—
Cross-Section
REYNOLDS NEW
Streamlined Regulator
which guarantees
greater capacity—
truer response—more
uniform performance



REYNOLDS BRANCH OFFICES: 421 Dwight Bldg., Kansas City, Mo.; 2nd Unit, Santa Fe Bldg., Dalias, Tex.
REPRESENTATIVES: Eastern Appliance Co., Boston, Mass.; F. E. Newberry, Avon, N. J.; G. H. Unkefer, 428 Boyd St., Los Angeles, Calif.

REYNOLDS GAS REGULATOR CO.
ANDERSON, INDIANA, U. S. A.

GAS CONTROL SINCE 1892

Showing stream flow characteristics of Type "p" Regulators.
Showing streamlined flow of fluid around valve when slight opening exists. Head pressure tends to close valve with direction of flow. Absence of turbulence insures long life of working parts and eliminates freezing due to impingement of flow around moving parts.
Direction of Flow
Compare the flows through these slightly open valves with pictures of single valve flow on opposite page and readily note advantages obtained with the use of Type "p" Regulators over conventional models.
Photographic
EVIDENCE
AMERICAN METER COMPANY
RELIANCE REGULATORS

AMERICAN GAS JOURNAL

JULY 1935

Auditing The Meterman

By
C. A. Renz

Assistant Supt. Gas Distribution, Los Angeles Gas and Electric Corp., Los Angeles, Calif.

THE application of bookkeeping methods to the business of discovering why a meterman is satisfactory under certain conditions and fails to function smoothly at other times has been found a practical part of the personnel program at Los Angeles Gas & Electric Corporation. The personnel has been considerably improved by the method.

The auditing method is designed to show up the strengths and weaknesses in the meterman's character or environment, including both his work and his living psychology. The system is applied regularly: especially when maladjustment with the work is noted or when the meterman is so well adjusted with the program of the Corporation that promotion seems to be in order. The system is always applied before an employee is dismissed. Often this enables the root of the trouble to be reached and eliminated. Such a procedure cuts down labor turnover. It also often saves very valuable timber that might otherwise have been removed.

The Nature of the Audit

Before explaining how the audit is applied, it is necessary to outline the nature of the structure on which it is based. This consists of a chart, covering thirteen points. Each point gives the meterman five possible ratings. They cover all matters that may have a bearing on the work, ranging from personal appearance, alertness, industry, to maintenance of equipment, service knowledge, etc. The five possible ratings under each point are: poor, fair, satisfactory, high, superior.

The auditing of the individual is conducted secretly; metermen are not aware of how the system is applied. Charts are made up, handed to supervisors, foremen, and others in responsible positions over the metermen. Each man makes out his rating by checking the individual points, as he sees the employee's characteristics. One man's opinion is never relied upon, nor do they know that others are also making out the chart. This procedure gives a cross-check on the employee.

CHART SHOWS

HOW AUDITING METHODS ARE APPLIED TO METERMEN.

Name: John J. Doe.

	POOR	FAIR	SATISFACTORY	HIGH	SUPERIOR
Appearance		✓			
Alertness	✓				
Executive Ability			✓		
Industry			✓		
Knowledge of product	✓				
Knowledge of office procedure	✓				
Maintainence of equipment		✓			
Personal Qualities				✓	
Physical Qualities				✓	
Sales Ability			✓		
Service Understanding		✓			
Tact			✓		
Value in present work.		✓			

These rating charts must be returned promptly to the office. There, they are filed under lock and key. The necessary precautions are taken to see that employees not directly concerned with the investigation do not discover what is afoot. After the charts have been used, they are destroyed.

Application of the Check System

The checking system proves to be almost as varied as the personalities of the individuals. Nevertheless, there are three broad conceptions covering the audits of men who are apparently proving unsatisfactory in their present positions. These are: (1) lack of knowledge; (2) dissatisfaction with the work or position; (3) personal troubles.

These are the problems most frequently encountered and the audit sets up an indicator of methods to be followed in eliminating these. When a checking shows that a meterman's principal weakness lies in lack of education on product, procedure, or service, further education is suggested. Dissatisfaction with work may spring from a number of causes, such as uncongenial relationship with fellow employees or superiors, unsuitability for the work. Some adjustment in the man's working conditions or a further study of his working psychology is indicated.

Personal troubles are very difficult. But since these are oftentimes so intrusive on the working psychology of the man, it is necessary to indicate some road toward solution or to suffer the loss of what might well be a valuable employee. An investigation of the employee's home conditions can be made by casual visits.

This resume is an explanation of the checking system as it would operate in the simplest types of cases. However, this is not often indicated so simply. Both personal indicators and weakness in work will be evidenced as going hand in hand as these two factors naturally react on each other to a considerable degree. It is then necessary to make a more exhaustive study, but no more so than conditions warrant. Hopeless cases are, of course, dismissed. In this last extreme, the personnel department has well grounded reasons to offer for the dismissal and this is not often possible without the check system.

But the principal thought is this: If growing difficulties are checked at the roots and some adjustments made it is not often necessary to bring about a dismissal. This, after all, is not the result of one isolated incident but of an accumulation. Why allow them to accumulate and spoil a potentially valuable employee in whom an investment has been made?

The audit is an ever-changing factor; it is not dropped after the first investigation. The "audited" man is followed over a period of time by further checks until it is apparent that he is out of the danger zone, will have to be dismissed or is due for a rise—depending on the reason for the initial audit.

Chart System Not Considered Conclusive

The charting system is not considered as conclusive. It is merely an additional, and more exact, aid in personnel relationships. Its most important use is that a base for investigation is established. Thus, the necessary decision is reached the more readily, and with greater justice to both the employee and the corporation.

Frequent, informal, visits with the employee while he is on the job, in the office or at home are used to widen the investigation. The check-chart is a base from which this operation may be conducted without lost motion. The combined opinions of a number of superiors in daily communication with the employee are thus supported by first-hand evidence. The chart is then studied from time to time; perhaps the following week another check will be made and these stacked against the originals.

Personal bias is eliminated as much as possible. That is why a number of charts are used. Conditions are constantly shifting; perhaps a foreman's original report may have been conditioned by a factor existing at the time and removed shortly. Nor are executives allowed to become biased by the system. The charts are destroyed as soon as they have passed their usefulness and thus cannot be utilized in any fashion other than their intended work—to remove difficulties and make better metermen.

Executive Committee A.G.A. at Atlantic City, May 31. Standing, left to right: F. M. Rosenkrans, Herman Russell, C. N. Lauer, R. J. LeBoeuf, Jr., A. S. Corson, Henry Obermeyer, T. R. Weymouth, J. F. Quinn, B. J. Mullaney, J. B. Tonkin, K. R. Boyes, W. C. Beckjord, C. A. Harrison. Seated, left to right: J. S. DeHart, Jr., O. H. Fogg, L. B. Denning, P. S. Young, H. O. Caster, Arthur Hewitt, J. F. Rooney, Alexander Forward.

Maintenance Contracts on Gas Refrigeration

By

Hugh H. Cuthrell

The Brooklyn Union Gas Company

THE gas refrigerator has been a great boon to the gas industry. Those of us who first started merchandising the Electrolux realized the possibilities of such a steady, year-round load builder on our lines. We devoted considerable effort to this pioneering work and then began to get returns in the form of refrigerator sales with their attendant sales of gas fuel.

The refrigerator, however, was something new for the gas industry. It introduced new problems, especially in installation and service. Principally there was the factor of water and its effect on the refrigerator. We learned about that through experience, our service men gaining their knowledge as a result of conditions existing in the territory. From these conditions and the solutions we worked out, the gas industry learned many facts which resulted in bringing down the cost of servicing gas refrigerators. The introduction of the air-cooled refrigerator also contributed to the bringing down of the cost of servicing.

With the increased sales of refrigerators there came an increase in service costs although in a lesser ratio. In line with the practice of our competitors, it was thought advisable to offer our customers a maintenance service providing for the replacement of defective parts for a fixed annual payment.

A year ago last March we introduced our refrigerator maintenance agreement by which refrigerator owners can protect themselves against any expense for replacing the unit, thermostat, burner, controls or any other part pertaining to the operation. As previously, labor service in connection with maintenance has been provided without charge.

The maintenance plan was scheduled to run for one year, from March 1, 1934, to February 28, 1935, with an annual charge of $3 for individual owners and $2 per refrigerator for apartment house owners who signed for six or more refrigerators. At the time the plan was instituted there were 38,671 refrigerators on our lines. Of this number many were less than a year old and hence covered by the manufacturer's warranty. From the remaining a total of 10,502 was signed up under the maintenance plan during the first year, all those signing throughout the year making a pro-rata agreement.

Thus all agreements expired on February 28 of this year. By that time our company had decided to continue the maintenance agreements, and we began signing up customers for another year. On May 31 we had 49,002 refrigerators on our lines, 16,604 of them in warranty and 32,398 out of warranty. Of those out of warranty 13,157 had been signed to maintenance agreements. Here it is interesting to record that of those now signed 7,726 were among the 10,502 who had maintenance agreements last year.

That pictures the way the situation is at present on our territory. Now I'll explain how our plan works. We have a complete card index of every refrigerator on our lines. The cards denote the class into which the refrigerator falls. There are three classes, as follows:

1. Refrigerators in warranty (those in service less than one year).
2. Refrigerators out of warranty but covered by maintenance agreements.
3. Refrigerators out of warranty but *not covered* by maintenance agreements.

When a call for refrigerator service comes in, it is checked against the file to find in what class it falls. The service man in the district is then notified of the call and the class in which it falls. If in Class 1 or 2, he knows replacements are made free of charge. If in Class 3, he informs the customer that replacements must be paid for.

Our service men handle all new agreements for individual owners while the wholesale sales force takes the apartment houses. A month before the warranty period expires a letter is sent to the refrigerator owner informing him of the expiration and explaining the refrigerator maintenance plan. Our service man either during his routine duties or during time off canvasses these owners and gets them to sign agreements. For such agreement he gets signed by a customer the service man is paid a commission of 75 cents. The wholesale salesman gets paid 10% commission for all refrigerator agreements he gets signed. For renewals of agreements no commission is paid as this is handled largely through the mail.

Our service men have performed a remarkable job in this effort. It must be remembered that they are mechanics and not salesmen, but their knowledge of the refrigerator's operation enabled them to do a fine sales job. Naturally they did not sell these agreements on a one-call basis. They usually made two, three and sometimes more calls before the customer signed the agreement. Yet they stuck to their work and successfully sold the maintenance agreement idea. They are continuing to sell agreements to all owners of retail refrigerators which pass out of their warranty period.

Believing that a year's trial of this agreement policy convinces the customer of its benefits, all renewals are handled by mail. Within a month before the agreement's expiration, a letter is mailed from our New Business Department calling attention to the expiration and reminding the customer of the protection enjoyed under it. From March 1 to May 31 we signed up 7,726 customers for renewals out of the 10,502 who had agreements last year. This indicates both the satisfaction of the customer and the fine presentation of the agreement idea by our salesmen.

The foregoing briefly presents the development and operation of our refrigerator maintenance agreement policy. It also presents the results insofar as signed agreements are concerned. Yet some of you, no doubt,

Read before N. Y. & N. E. Regional Sales Conference, New London, Conn., June 27, 28 and 29, 1935.

are speculating about the financial results. We have found this arrangement quite sufficient to meet the costs of the refrigerator parts supplied. However, we believe it will be advisable to continue the present early rates of $3 on retail refrigerators and $2 on wholesale refrigerators for an additional time to come to a definite conclusion regarding the matter.

Naturally with another year of life added to these refrigerators, the probability of increased cost for replacements is greater. To offset this in whole or in part are agreements signed by owners whose refrigerators are just passing out of the manufacturer's one year warranty period together with the absence of paying comissions on re-signed agreements. How evenly that balance will be effected only time will tell. W ein-Brooklyn believe it will balance.

Today we have developed our agreement policy to the point where it will be a job of just selling the customer once on the basis of annual payments. Mrs. Homemaker will be visited by one of our service men at the time when the refrigerator is about to pass out of warranty. He will explain the maintenance agreement plan on the basis of annual payments for this service. The following year she will receive a notice stating that her annual payment is now due. In this way our refrigerator maintenance agreement becomes a permanent policy with us. We believe firmly that it will work to the advantage of the customer and ourselves through decreasing our replacement costs and avoiding customer animosity from having to pay for a thermostat or unit. Such a situation will maintain our good public relations upon which depend future sales not only of refrigerators but also of other domestic gas appliances.

The British Gas Industry

Recent Developments of Interest

By Journal Correspondent

The King's House

The members of the Royal Warrant Holders' Association have combined together to present his Majesty, King George V, with a completely equipped and furnished country house set in the middle of the lovely English countryside at Burhill, Surrey. The house is not large — it includes two living rooms and three bedrooms, apart from the servants' quarters—but it incorporates all that is good in present-day British architecture and planning.

Particularly up-to-date is the kitchen, tiled throughout and containing a specially designed streamline gas range. This range shows a decided break-away from the usual British design in favour of the American type of range. It is built on a solid pedestal and is carried out in streamline style to fit flush with other pieces of kitchen equipment. It is finished in "Jubilee" blue enamel and stainless steel with taps and oven handles of black bakelite. The oven doors drop outwards to act as a shelf and the boiling burners are self-lighting when the taps are turned.

Other gas appliances in the King's House include a hot cupboard for plate warming, an airing cabinet for the laundry and five gas fires of attractive appearance. The hot water supply is heated by an automatically controlled gas-coke boiler (in winter) and two automatic gas boilers (in summer); and a coke-fired plant with automatic feed and thermostatic control is installed for central heating.

National Kitchen Planning Competition

The British Commercial Gas Association, which is the publicity organization for the British gas industry, has just concluded a very successful kitchen planning competition. Competitors were asked to cut out scale drawings of various kitchen appliances, and paste them on a plan, adding their views on colour schemes, wall and floor coverings, etc. Prizes totalling £1,000 were offered for the best entries. Over 23,000 entries were received, some from as far afield as New Zealand and South Africa, and considerable publicity for gas was obtained by the fact that a man carried off the first prize of £500 in face of all the women entrants.

Gas Floodlighting Making History

Almost every town and city in the British Isles arranged a floodlighting scheme to celebrate the twenty-fifth year of King George's reign. Among the historic buildings illuminated by batteries of gas projectors during the Jubilee festivities were Warwick Castle, Chester Cathedral, York Minster, Blackburn Cathedral, Manchester Art Gallery and an immense number of churches, war memorials and public buildings. In London some 200 gas lamps, scattered among the bushes in St. James's Park, floodlighted the flowerbeds, the lake and the islands with the most beautiful night effects.

Gas undertakings in Great Britain find that floodlighting pays not only as publicity, but through permanent installations for the illumination of hotels, cinemas and open-air swimming pools.

Gas Supreme in Big Kitchens

The supremacy of gas for large-scale cooking in the British Isles is shown by some recent installations. The House of Commons Kitchen is now an all-gas one; gas cooking apparatus has been installed in the kitchen of the Metropolitan Police College, in the Law Courts, London, and in the new headquarters of the Royal Institute of British Architects. Nearly all the great British hospitals are large gas consumers for culinary purposes, as are the leading hotels and restaurants. Among the latest restaurants to choose gas for their kitchens are the Cumberland Hotel, Marble Arch, the Berkeley Hotel, Piccadilly, and Prunier's Restaurant, St. James's Street.

Changing Tariff Schemes

British gas undertakings are gradually abandoning the old flat rate system of charging in favour of two-part tariff schemes and new scales of charges. Some of these incorporate a first charge based on the ratable value of the consumer's premises or the number of rooms occupied; and a low flat rate for all gas consumed; others employ a scale of charges on which the price of gas decreases as larger amounts are consumed. One undertaking has an interesting scheme by which domestic consumers are given a rising scale of discounts on their gas bills according to the number of gas appliances used by them. This scale varies from .8 per cent, where the consumer uses a gas water heater and two other appliances, to 20 per cent., where a water heater and nine or more other appliances are installed.

Gas Pressure Controls

INSTALLATION OF LINE REGULATORS

Part II

By

Erick Larson

Gas Engineer, Long Island Lighting Co., New York

WHEN lines are not anchored in walls excessive strains in fittings or regulator body may originate from ground movements causing angular or transverse movement of the pipe external to the structure. The proof of this contention may often be demonstrated by loosening the bolts on a flange and observing the angularity of the resulting opening between flange faces which angularity was not existent at the time of erection.

Installing a small connection for either a pressure gauge or static line is desirable between the wall and the first fittings, which is usually a shut off valve. When repairs are being made or the regulator shut off for any purpose it is convenient to have pressure gauges easily visible from a position alongside of the regulator on both inlet and outlet so that conditions may be observed by the repairman who must often hand-control the pressures by means of the by-pass valve or regulate the amount of work to be done by pressure conditions on the outlet. Having the static line attached external to the shut off valves will allow for opening and closing tests on the regulator by pressure rather than by hand previous to both initial and subsequent placing in service of the line regulator. The gauges are seldom of a permanent type but are set up only during repair work or pressure testing. The design of the take off depends largely on local conditions but ordinarily the welding or brazing on of a small coupling is preferable to a nipple. The advantages of a coupling instead of a nipple are that a coupling has heavier walls and, therefore, offers less welding difficulty when attaching the coupling to large sized mains, has a greater strength, the threads are not as easily damaged by either welding or being struck during construction work as those on a nipple would be and is easier to connect to and produce a tight joint. The advantage of a nipple would be its greater length and ease of varying that length when proximity to other parts of the regulator or auxiliary equipment would make that additional length a convenience during the attaching of other fittings. The size of the connection is seldom more than ¾" as even that size is more than ample for gauge connections and static lines but is used to secure the added strength over that of smaller fittings, the more frequent occurrence of ¾" pipe and connection on high pressure work allows the use of standard stock, the possibility of its use as a connection for the by-pass, possibility of its use as a connection for ventilating fans and the lesser possibility of its being clogged by foreign matter than smaller sized connections.

A screw connection may be used for the take off if desired but has more disadvantages than advantages. Tapping and threading the main requires more time and space than welding. To secure good threads in a tap is difficult particularly on the size of mains common in high pressure distribution. A clamp requires more space than can ordinarily be spared and adds an extra joint.

Shut Off Valves Recommended

Shut off valves for completely closing off the line regulator are practically always installed inside of the regulator structures and valve boxes or opening provided in the structure through which keys may be inserted from the outside. Providing this safety measure of accessibility of valves from outside the structure costs but little and is a recommended procedure. Valves located in the structure may also be used by repairmen without the necessity for going outside the structure each time manipulation is required. The internal location also provides more convenient locations for the inspection and maintenance of the valves. Valves installed in a structure above ground which must be accessible for operation from the outside are usually placed in a vertical run of pipe rather than horizontal to allow inserting the key horizontally through the structure walls and to eliminate a gear mechanism. Gate valves are preferably installed horizontally to assist in preventing foreign matter accumulating underneath the gates. The design should

Temporary and permanent gauge connections by means of nipples welded to main. Note temporary gauge is between shut off valve and regulator.

provide sufficient space for proper operation of the valves by means of wrenches or keys when inside the structure. It is sometimes assumed that gate valves invariably operate easier than plug valves and, therefore, less space will be required for swinging a key or wrench. In any design the average operating condition can not be taken advantage of but the unusual, although only of infrequent occurrence must be used as a basis. A gate valve will on occasions require as great a force for starting its operation as a plug valve due to gums, corrosion, foreign material wedged in the gates or lower part of the valve and conditions which might occur in the stuffing box. Construction should also provide convenient working space for the tightening or repacking of stuffing boxes or operation of the particular method of lubrication used on plug valves.

Source of Leakage

A frequent source of leakage is shut off valve flanges often due to the lack of space in which to tighten up the flange bolts particularly those on the bottom. While increased space is expensive a leak on the flanges of a gate valve would often result in an operating expense greater than the additional capitalization required to provide the increased space. Ordinarily valves are installed of the same size as the main particularly at the outlet although the regulator may be of a smaller size to provide for future increase in regulator size without the necessity of shutting off consumers. When screw connected valves are used space should be provided so that they may be installed without disassembling. On and above the four-inch diameter pipe the use of flange connected valves will usually be found a convenience as any leakage developing in a screw joint is more difficult to repair than that occurring on a flange. On three-inch diameter and below screw joints are practically universal as flanges in these sizes are difficult to maintain gas tight due to the few bolts used, the difficulty of making up the bolts and the added space required.

Flexible regulator layout. Note supports.

Rigid or Flexible Method

Among other general decisions to be made during design is whether a rigid or flexible method of construction is to be adopted. In the rigid type no flexibility or give is provided at any of the joints or in any of the connections. The final connection must be made by means of a flange or union which requires exact lining, perfectly cut threads, flanges without any angularity and cutting of all pipe to exact lengths in order to have the final connection join without straining of any parts. All of these qualifications although necessary are impossible to secure in practical construction with the result that the last joint connected must be forced either together or apart causing a strain at one or more points. The resulting strain is seldom of uniform intensity on each part of the circumference of a flange or union and, therefore, frequently causes a breakdown in the leak proof value of joints. Replacement of the fittings or the regulator on rigid construction is difficult as it is seldom possible to secure fittings or equipment which have the exact dimensions of the original. When rigid construction is used it is desirable to make the last joint a weld in one of the short pipe sections as a slight angularity or difference in length may be taken up in the weld. However, even with the use of welding strains may result from the welding operation or develop after construction and have no means of relief due to the rigidity of the entire structure.

The difficulties of securing a proper construction job are increased when the by-pass is three inches or more in diameter as pipe of that size lacks flexibility and the resulting stresses are not partially relieved by bending of the pipe itself. With the addition of the by-pass a solid rectangle of fittings and piping results, producing a difficult construction task to secure a structure which will be not only initially but permanently leak proof. Emphasis is placed on the leak proof nature of a regulator installation as a very small leak will have a cumulative effect in a pit or small building that will result in unsafe working conditions together with the hazards existing whenever an explosive mixture occurs. The only practical advantage of a rigid construction is the

Line regulator installation with valves facing in direction most convenient for operation. Frequency of slip couplings furnishes a flexible system.

saving of space resulting from the non-use of an additional fitting whose purpose is to produce flexibility and facilitate replacements.

Flexible Leak Proof Joints

Flexible construction provides one or more flexible leak proof joints which take up any slight angularity or difference in length without causing internal strains. The flexible joint should be capable of relieving ordinary stresses incurred after installation. For instance the weight of part or all of the equipment may produce more settlement at one point than another but the flexible joint would relieve any strain. A slip coupling installed on the outlet side of the inlet shut off valve and another on the outlet side of the bypass shut off valve is the usual method for providing flexibility. The inlet side of the regulator is usually selected as the size of the pipe connections are ordinarily smaller than on the outlet side. A short type of coupling with no bead inside of the barrel will prove satisfactory and due to its shortness will conserve space. The bead on the inside of the barrel is eliminated so that the coupling may be easily slipped onto either section of the adjoining pipe. A length of pipe on either side of the coupling sufficiently long to permit slipping the coupling entirely on the section will facilitate construction and replacement work. All other joints may be made up where convenient whereas if only sufficient total room between flanges or joints is provided for the coupling the flange or other type of joint must be made up after the coupling has been placed on the intervening pipe.

The slip coupling would then interfere with making up of bolts on adjacent flanges or leave insufficient room for the wrench used in the making up of screw joints. The slip coupling would be the last joint to be completed and in close quarters any adjacent flanges or equipment may inconvenience tightening of the coupling bolts. This last disadvantage is often true where the slip coupling may be partly moved onto one piece of the connection while making up the flange or screw joint on the other side. An added disadvantage occurs when the slip coupling gaskets must be installed where chain tongs or stilson wrenches used in making up adjacent joints have left sharp burrs, grooves or ridges on the pipe. The overcoming of disadvantages will more than compensate for added housing size. An advantage claimed for restriction of space for a slip coupling is the elimination of any possibility of a slip coupling gasket being installed partially or wholly in the space between the two sections of pipe and be a potential source of leakage. Even though space can not be provided for moving the slip coupling completely onto one side of the coupling joint the flexible type of construction is recommended.

Where the space provided for a slip coupling is limited it is often possible to provide sufficient length on one of the nipples to slip the coupling all onto that side by having the opening in the pipe near one end of the slip coupling rather than at its exact center. Providing a distance of only half an inch of pipe between the inside face or tip of the gasket

Rigid design. Weld just above shut off valve is last joint to be completed.

and the free end of the pipe would be a sufficient safeguard and provide ample excess to care for slight variations in the placing of the slip coupling in position during construction or operation.

Safety Factor

A flexible design besides providing a safety factor against construction or later occurring stresses causing leakage or breakage facilitates removal of portions or all of the regulator equipment in large units which can be quickly replaced with other identical units thus allowing repair of the regulator or equipment removed at the convenience of workman and in a shop equipped with more facilities for quality repairs than are possible in the field. The ease with which a slip coupling may be removed provides a convenient means for internally inspecting the pipe for corrosion, gums and any other foreign matter which may be causing trouble.

On either the rigid or flexible types of construction supports are desirable especially for the heavier pieces of equipment such as valves and line regulators. Supports will relieve strain in joints beyond that relieved by slip couplings and caused by the dead weight of the equipment.

Blowing the feed mains clear of foreign matter even after the regulator has been in use for some time and particularly when continuous trouble has been experienced with foreign matter collecting on the valve discs or orifice seats is facilitated by the convenience with which the slip coupling may be removed. When used for blowing out the main opening nearest the regulator should be closed with a piece of tin, metal or wood to prevent any foreign material blown out from entering the regulator. The advantage of using the opening in the pipe at the slip coupling joint for blowing out foreign materials is that a much larger opening may be provided than through the ordinary drip or blow off pipe. When the blowing gas is allowed in the housing every precaution possible to prevent ignition must be followed including a bag over the open pipe end to prevent fast moving particles from striking on any object which might result in a spark. A preferable procedure is to run a canvas or similar material hose into the atmosphere to a point where dilution of the gas will be rapid and completed before the air gas mixture could reach any housing or source of ignition. The frequency of conducting potentially hazardous operations without accidents frequently leads to carelessness. Thinking should be emphasized as essential even before starting any operation involving gas even though the particular task has become monotonous through repetition.

Flexibility Essential

When the pipes entering a housing are not firmly anchored in the masonry or at some adjacent location flexibility in the equipment installed is essential and recommended as a safety measure and is best provided by a slip coupling or its equivalent. When the slip coupling is installed inside of and adjacent to a wall in which the pipe is not anchored or is installed on unanchored pipe but some distance in a straight

line from where the pipe enters the wall care should be taken that the slip coupling will not be required to act as an expansion joint. Where the pipe before entering the wall has a long straight run above ground a regular expansion joint rather than a slip coupling should be used as the value of a slip coupling in caring for expansion and contraction is limited.

The columns or supporters for a line regulator or similar installations may be solid or adjustable. A solid support may consist of a concrete block or pier, wood or continuous piece of pipe. Such supports must be made to exact dimensions which is particularly difficult in the field. A preferable simple type is a piece of pipe cut at some convenient point, the two ends threaded and a standard coupling connecting the two pieces. This support could be shortened or lengthened vertically a limited amount but sufficient to secure perfect alignment of regulator parts. The coupling may be placed on one end of the piece of pipe which would allow approximately one-half the change in length possible with the coupling between two pieces. More elaborate supports are constructed by the use of two pipe columns with couplings having a cradle between, which cradle supports any of the desired apparatus.

The support should be placed before flanges or screw threads on the equipment to be supported have been made up tight. The adjustable support may then be changed in length sufficiently to secure perfect alignment and the parts made up. On solid columns the length must be short of actual requirements and the difference made up by wedges or shims. On either type it is preferable not to have the support integral with or securely fastened to the structure to eliminate the extra cost of construction and added difficulty of alterations.

A connection installed between the outlet of the regulator and the outlet shut off valve for attaching a gauge will provide a convenient means of making a lock up test. This connection is usually designed to end in a shut off cock without a permanent gauge installed as the gauge may be damaged during repairing or inspection of the regulator. When the main regulator bowl or other equipment projects over the pipe between regulator and shut off valve it is sometimes more convenient to install the gauge take off on either side of the pipe than on the top. The preferable side would be that opposite to where a repairman ordinarily works. Instead of a connection installed on the piping between regulator and shut off valve the flanges of either may be purchased with a gauge connection or may be drilled and threaded to provide for a connection. This gauge connection may be also used to attach a hose or pipe connection run to a safe place away from the regulator structure to carry off gas when making a flow test at low capacities. When the connection is used for this purpose it is preferable to have a larger size of opening into the main than can usually be secured through a flange.

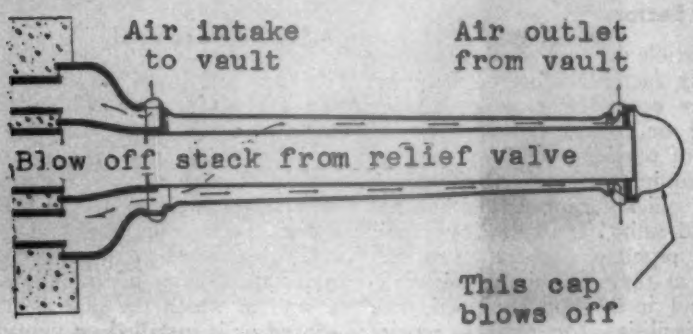
Connection Helps Tests

The provision of a connection facilitates the repairman making an actual test of the operation of the regulator at low flows and repeated lock up tests and often results in improved operating conditions after placing the regulator in service as the repairman may conveniently observe repeated actual operating conditions. A design providing a permanently installed connection run to the atmosphere to facilitate the inspection and repairman's tests is not recommended as it is difficult to determine whether the valve has been partly left open and by-passing gas to the atmosphere and also the atmospheric opening may not always be in the most satisfactory location which alters with the change in wind direction. The location of a permanent line would ordinarily be carried along with or out through the usual atmospheric vent line for the housing and gas escaping from the test line might return through the vent. If the line is permanently installed an advantage is secured by running it inside the structure and dead ended so that it may be used for other purposes than lock up tests. A temporary connection may be run from the dead end to any desired location. The cock or valve on the lock up test connection should be plugged besides shut off after each use.

Lubricated plug cock.

Shut off cocks are frequently used on line regulator equipment on gauge lines, small auxiliary lines, etc. Iron body or semi-steel body cocks are preferable to all brass and lubricated types are preferable to all other types for reasons similar to those mentioned during a discussion of services. The plans should indicate the direction in which the plug of the cock is to be installed. The direction of the plug and location of cocks are important if they must be used by the repairman and should be not only within easy reach but operate in a direction providing the greatest convenience. Emphasis of convenience for the repairman is important in that facilitating each of the necessary operations allows the repairman to concentrate on the actual operation and functioning of the regulator instead of being continually on the alert to protect himself from possible injury in the cramped quarters turning the wrong

(Continued on page 52)



Ornamental pit ventilator

The Importance Of Record Control To Executive Management

By
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MANAGEMENT cannot function efficiently without complete and adequate records to guide and influence every decision. Many executives have, until recently, considered records and books necessary evils rather than indispensable aids in the conduct of business. It has been my observation that there are usually reasons for every condition. The reason that records have been in ill repute is that they have failed to accomplish what was expected of them. They have failed to sound the warnings and dangers when trouble really existed. They have failed to provide the controls that are so necessary and vital in guiding those responsible for both the success and failure of every enterprise. The failure of records to provide the necessary controls can usually be charged to the fact that they have not been properly designed or their functions carefully planned.

Accounting records are an absolute prime necessity to the successful operation of any organization. Record control is to executive management what guide posts are to a traveler in new and strange territory, because just as the traveler is unable to tell what he will have to face just around the next corner or just over the next hill so the business executive must be prepared for all emergencies with definite information covering past experiences. Guess work must be eliminated, and all operations must be based on the firm foundation of accurate and complete knowledge. Reports that are not accurate, complete, or reliable are like road signs and guide posts that direct the traveler the wrong way. They are worse than none at all—even guess work would be safer, because, according to the law of averages, there would be a 50-50 chance of being right. The big majority of mistakes made by operating executives is due to either a lack of information or to reports that are not complete, accurate, or promptly rendered.

We often hear the charge made that bookkeeping costs are too high, and this fact can very often be substantiated because it is true that in too many instances accounting methods have not kept pace with the improvements and advances that have been made in construction, production, distribution, and utilization methods. Bookkeeping is defined as an art, and accounting is defined as a science. The bookkeeper records the facts by the method and on the forms as designed by the accountant. These facts must then be interpreted by the accountant to the management in the form of reports and statements. The accountant must occupy the same position with respect to accounting controls as the engineer does to plant operation and management. If plant workmen were allowed to perform the functions and duties that belong to the engineer to the extent that bookkeepers have been permitted to fill the place that belongs to the accountant, then modern plant management would still be an unknown quantity and an undeveloped science.

"A business without its records is like a man without his memory." This is a very unfortunate state of affairs, yet one which exists in thousands of organizations. A situation has developed during the past few years which makes it practically impossible to operate without records that are the last word in efficiency.

The opinion still exists that complete accounting systems are complicated to operate and require highly trained personnel. Quite the contrary is true, because in place of the multiplicity of forms, duplication of effort, and the unnecessary transcription of information, which are to be found in the average system in use today, an up-to-date system provides a method of procedure clearly outlined and well defined which is easy to follow and which eliminates both errors and confusion. A system properly designed and installed will definitely fix complete responsibility for every action, which will entirely eliminate "buck-passing" and insure a degree of accuracy and the prompt preparation of all reports and statements that would ordinarily be considered impossible.

Causes for System Failures

Let us consider in what respect record systems have failed. I have, in many instances, found the same information, with slight variations, duplicated in as many as three, four, or five different forms, whereas one form, properly designed, would have made it possible to bring the complete information together in one place and would have effected a large saving in clerical effort, filing space, and reference time. The multiplicity of forms that exist today is due to the fact that each time a slight variation in requirement has developed a new form has been added to the collection, instead of re-designing the original one. It has resulted in the necessity of duplicating much of the information on each form. Many organizations have reduced the number of forms to less than 25% of the original number by proper coordination and re-designing. It is necessary to take inventory periodically, to determine whether or not existing methods have kept step with the new, or whether old antiquated methods act as a brake on the rapid advance and progress which should be made by every organization that is alive to it.

The question is often asked "What are the particular advantages of better record control?" The answer is simple.

From the standpoint of public relations and good will, it is absolutely essential that any error or discrepancy that may exist in any customer's account be detected and corrected before it is discovered by the customer. There is nothing that destroys public confidence in commercial, industrial, public utility or

public institutions with whom they may deal as much as errors which affect their account. As soon as one error has been discovered they become very skeptical concerning the accuracy of all future transactions. This creates a state of mind which is very likely to presuppose that the company records are wrong whenever anything occurs which appears irregular or which they cannot thoroughly understand. Public confidence is absolutely essential to the successful operation of any institution or enterprise, because it represents the most valuable asset which any organization can possess.

The most effective way in which to insure work of the highest quality from the clerical personnel is to provide some means for accuracy, measuring both the quantity and quality of work done by each individual and definitely fixing complete responsibility for errors. It is impossible to do this without records that are up to date in every respect. It is human nature to become careless unless we know that an accounting must be rendered for the amount and kind of work we perform. It is likely to create the feeling among even the most conscientious clerks that they receive no more credit or recognition for their services than other clerks in the same office who are less conscientious and who may turn out an inferior quality of work. Proper accounting methods and records, combined with efficient procedure, will definitely reveal the exact condition, give credit where credit is due, and place the blame and responsibility for poor work and poor results where it belongs.

The periodic auditing of records is absolutely essential. Unless the system is modern and up to date, with proper controls provided, the auditing expense not only is greatly increased but it becomes very difficult for an auditor or accountant to provide an unqualified certification as to their accuracy. With proper records which provide the necessary controls, an audit can be completed in a fraction of the time otherwise required, and positive certification can be made concerning the accuracy of the records and the operating results. This very often represents a priceless asset from the standpoint of obtaining necessary credit. No financial structure is safe without control safeguards of this kind. Public criticism and condemnation of what might appear to be carelessness and inefficiency is often unmerciful. There have been many instances when the honesty and integrity of officials have been questioned, when, as a matter of fact, the conditions which existed were entirely due to a lack of proper record control or failure to detect conditions that needed attention. Nevertheless, conditions of this kind are often difficult or even impossible to explain to the satisfaction of all concerned. The responsibility of the management is heavy enough and the load is difficult enough to bear without having to shoulder unnecessary criticism. There is no one factor that relieves a managing executive of as much anxiety as the certainty that all records are correct and all operations properly accounted for.

In a public utility organization there is always political opposition to be taken into consideration. There is no one factor that has provided more and better material to support the arguments of demagogues and political opportunists than the lack of proper accounting and record controls. Lack of these important aids to executive management have often made many perfectly sound and logical situations extremely difficult to explain. Every executive should avail himself of every possible agency that will not only reveal every condition that needs attention but that will also establish to the satisfaction of all interested parties the fact that the operation of the enterprise is thoroughly efficient in every way. Self-preservation is said to be the first law of nature, and there is no better or more effective way to insure this, in either private or public operation, than to safeguard all functions through proper record control.

Operating Factors That Must Be Controlled

In this article it is only possible to briefly mention some of the major factors that require proper control. It is impossible to enter into a detailed discussion of the records necessary for this purpose or the many elements that are very essential in a complete analysis of these various records and functions referred to.

Meter Control

It is very important that every meter be accounted for, by meters either in service or in stock. Then, meters in service must be accounted for as either active or inactive. Next, the active meters must be accounted for as either meters billed or meters on which the readings could not be secured. Without these controls many meters may become lost or stolen, and many instances have been disclosed of customers' using energy for several years without ever receiving a bill. This is not so likely to occur in small communities as in larger centers, because in small communities the meter readers are usually better acquainted with conditions and are personally familiar with every service location. It is, however, putting the burden of accuracy on a very uncertain basis, because it opens the way to dishonesty. With these controls an auditor can very quickly make a verification, and certify as to the accuracy of the record. It is also important that these figures be maintained in order to show all increases and decreases from month to month and so indicate the trend of certain factors, because this is the only way in which a situation can be properly analyzed, and the proper remedy prescribed and applied.

In some instances, meter records have been maintained that required a large amount of unnecessary clerical effort. The name of the customer occupying the location where the meter is in service has been posted, as has every subsequent change of occupancy, whereas it is only necessary that the meter record show the location of the meter. This, under ordinary conditions, eliminates approximately 90% of the posting otherwise required.

Billing Control

It is absolutely essential that proper billing control be maintained, in order to insure all bills being rendered in accordance with the proper rates, connected load, and other special billing information. By classifying meters and customers according to class of service in each group, a proof may be secured that bills are rendered accordingly. The computation and correct extension of all bills should be proved by breaking the consumption down into rates and steps and then multiplying the various totals by the corresponding rates to prove with the total of all bills as rendered. All rate and billing information should be shown on the meter-reading sheet and periodically checked with the Customer Service Record for vertification.

The meter-reading sheets should be housed in proper binders, carefully locked, in order to provide insurance against unauthorized changes or removals of sheets. It is also recommended that meter sheets be so designed that it is only necessary to change the name of the customer and thus make it possible to

accumulate the complete record showing the performance of each meter for the period of time that it is being used at the same location.

This eliminates the necessity of transferring and transcribing meter numbers, sizes, specifications, previous readings, location of meters, address, and account number. It greatly reduces the possibility of error and effects a saving in clerical time, because the name of the new customer can be entered in a fraction of the time that is required for changing the sheet and transferring all of the information referred to. Furthermore, it proves that the account is opened for the new customer, with the same readings being used as were used for rendering the final bill to the previous customer.

The majority of high bill complaints result from incorrect readings. This can be almost entirely eliminated by requiring the meter reader to compute and extend the consumption while on the customer's premises. If the consumption is found to be unusually high or low, he can make a verification of his reading before leaving and then initial the sheet to indicate that this has been done. This practice eliminates the necessity of making a special trip to vertify the accuracy of the reading when later discovered and questioned by the Bookkeeping Department.

Accounts Receivable Control

Probably the most vital and important control to maintain is on Accounts Receivable. It is first necessary to determine the unit of accounts on which controls are to be maintained. In a small organization it is necessary to establish only one control covering all accounts, provided all of the balancing is done at the end of the month, whereas in a larger organization accounts must first be divided into districts, one district representing one day's readings and one day's billings and a section of accounts which must be balanced in one day. A control should be maintained for the district as a unit, or for sub-divisions of a district, and each district should be balanced the day immediately preceding the preparation of the bills each month. This insures all arrears that are being brought forward on the new bills as being absolutely correct. It also eliminates any peak load at the end of the month or at the end of the billing period.

A record is set up for each control unit and charged with the total of all unpaid balances being brought forward on the new bills. It is also charged with the total of all bills rendered and then credited with the daily totals of cash receipts. Any collections or postings made through the medium of journal entries which increase or decrease the amount of the outstanding balance are also posted to this record. The difference between debits and credits, which should be extended daily, must equal the total of the unpaid accounts at all times. This control provides positive proof that all cash receipts have been properly posted, that no accounts have been lost, and that all charges have been properly accounted for. It also provides a comparison of outstanding balances with the previous month or the previous year, in order to accurately determine the condition of collections.

Control on Forfeited Discounts and Penalties

All forfeited discounts or penalties should be set up as soon as all payments received during the net payment period have been posted. The total of such items should be immediately charged to the Accounts Receivable control and credited to the proper revenue accounts. This provides a positive control and insurance against failure to collect or report any such items. This method also eliminates the necessity for analyzing the cash receipts each day to determine how much of the amount collected represents forfeited discounts or penalties. It insures accuracy, eliminates the possibility of any irregularities, and reduces clerical effort.

Controlling Inactive Meters

A large investment is often tied up in inactive meters. Records should be set up to automatically control all idle meters according to the length of time they have been out of active service. A careful analysis has definitely established the fact that meters should not be left idle in vacant premises for more than six to nine months, because any premises that have been vacant for this length of time are likely to remain vacant for an indefinite period. It has also been found that many meters are lost or destroyed if left in for too long a period of time. In addition to this, it has been found that in certain sections of the country certain types of meters do not register as accurately after having been idle for an extended period of time unless they are properly cared for. This causes a substantial loss in revenue.

Controlling Material, Supplies, and Merchandise Stocks

Complete and accurate records and controls are always maintained on cash. Expensive equipment is provided for the purpose of registering, recording, and auditing every cash transaction. Yet, when cash is converted into material, supplies, or merchandise the control usually becomes very lax. The sense of value seems to be lost in many instances. Thousands of dollars worth of stock is kept without proper record control. It is very important that proper records be maintained, responsibility established, and an adequate audit made from time to time. Unless this is done, large amounts of material and supplies are never accounted for.

Material and supplies should be broken down into various classes, and an authorized budget established for each class, depending on the amount of material used in each particular location. This will insure the establishment of an accurate barometer and an analysis of the activity in each classification. The over all turnover may appear reasonably satisfactory, and at the same time badly overstocked conditions may be covered up in certain classifications in certain locations.

Distinction must be made between stock control records and stores accounting records. The purpose of stores accounting records is to account for the value of material and supplies stocks and to balance the actual inventory with the book value, but it is not the function of the Accounting Department to concern themselves with the various factors and elements of stock control. The responsibility for maintaining proper stock conditions must rest with the Stores and Purchasing Departments. They cannot discharge this responsibility properly unless they are provided with records especially designed for the purpose.

An apparently satisfactory overall turn-over does not necessarily indicate efficient control methods or the uniform soundness of stock conditions. It may be due to large construction projects, extensive maintenance operation, or unusual activity in one or two classifications. What might appear to be an excellent overall turn-over might conceal a serious obsolete, destandardized, or over-stocked condition in several other classifications. Therefore, unless both inventory and movement of stock are analyzed by classifications it is impossible to determine where improvements can be made.

(Continued on page 46)

Flash System of Carburetting

A Description of a Continuous Gas Process

By

Theodore Nagel

V. Pres. & Chief Engineer
Carburetted Gas, Inc., New York

CARBURETTED water-gas produced from coke, steam and oil by the alternating "blow" and "make" intermittent gas operating cycle in a three shell gas machine was originally developed to commercial utility sixty years ago by Professor Lowe, of Norristown, Pennsylvania.

Statistics of the gas industry in the United States for the year 1930, compiled by American Gas Association, show carburetted water-gas was 48% of the total manufactured gas sold to public utility customers, a remarkable evidence of the merits of Professor Lowe's achievement when realizing that the present day method of generating carburetted water-gas exhibits no major change in the Lowe intermittent gas generating cycle.

Improvements of a minor order have been made in the gas making equipment, the most notable being the automatic cycle control, the automatic grate and automatic ash removal, back-run connection to the generator and, within the past five years, gas-oil displacement by heavier oil for water-gas enrichment.

Having similar composition and characteristics or specifications of carburetted water-gas, public utility gas can be generated in a single shell gas machine by a continuous flash system using oxygen and heavy-oil (oil of lower cost than gas-oil) for gas making.

This flash system continuous generation of carburetted blue-gas eliminates the usual carburetor and superheater chambers with their periodic checker brick renewals, does away with solid fuel storage and handling as well as ash disposal and also eliminates boiler plant operations for generating steam used for water-gas production to effect substantial economies in gas production through lower cost of gas making materials, less labor with lowered plant operations cost and fixed charges on lower plant capital cost.

Compressed air, from which the nitrogen is automatically separated through counter-flow heat exchange liquefying and rectifying the air, provides a continuous electric power load for operating motor driven air compressors to produce a continuous supply of oxygen.

The ingredients for the flash production of one thousand cubic feet gas of public utility standard specifications having a thermal value of 540 B.T.U. per cubic foot amount to 5 gallons oil (bunker C fuel-oil or similar type heavy-oil) and for the necessary oxygen 4 kilowatt hours, which is equivalent to a continuous power service of 167 kilowatts when generating one million cubic feet of city gas in 24 hours. In a populated district consuming gas generated by this continuous flash system the public utility gas plant will be an industrial power consumer of the first magnitude.

Continuous flow gas production, as hereinabove described, the most economical and ideal method for gas generation, has been the ambition and the dream of the gas man for many years.

Low-Cost Air Liquefaction and Rectification Plants for Producing Gaseous Oxygen (95% O_2).

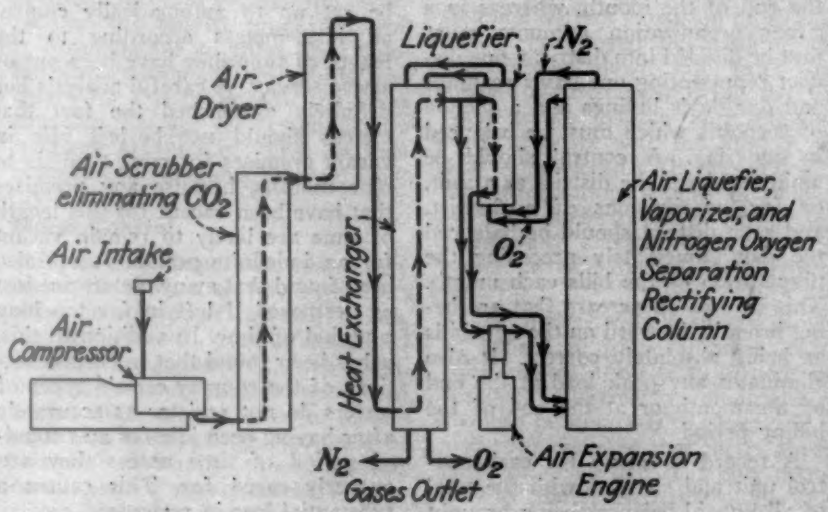
In excess of 3 billion cubic feet of 99.5% purity oxygen was sold in the United States in 1929, the output from 156 plants which have production capacity to provide for the probable increase in demand for high cost pure oxygen for many years to come. Practically all these oxygen plants are of small units, capacities under 5 tons oxygen daily output.

The pure oxygen output from these plants, largely supplied in cylinders, is primarily used for welding and cutting metals. A few liquid air plants have recently been located adjacent to and supply gaseous oxygen through pipe lines to steel plants on long term contracts. The lowest price for this service, reported in 1932, was $2.80 per thousand cubic feet, equivalent to $66.00 per net ton oxygen.

High capital cost of plants and high production cost of pure oxygen have made the extensive use of oxygen prohibitive in metallurgical and other industries.

"Availability of Oxygen"

United States Department of the Interior, Bureau of Mines, "Report of Investigations" Serial No. 2502 page 4.



"In view of the many recent developments in oxygen manufacture, and considering the increasing cost and decreasing quality of our raw materials, the Bureau of Mines, Department of the Interior, has taken the matter of the application of oxygen or oxygenated air to the metallurgical centers for consideration and has appointed an Advisory Committee to study the problem.

"This committee has made a thorough survey of the existing processes for the manufacture of 99 per cent oxygen. The conclusions reached by this survey are that the comparatively small demand for the product has prevented the installation of large units suitable for metallurgical processes, with corresponding economies, and by far the greater proportion of the present cost of oxygen represents the cost of transportation, storage and service. Large oxygen manufacturing plants can be built to serve metallurgical purposes directly, which, by virtue of their large production and correspondingly increased efficiency, together with the fact that no compression in cylinders, storage, transportation, or service will be required, will be capable of delivering oxygen for the processes at a cost not to exceed $3. per gross ton. In other words, the Committee finds that the oxygen industry is now able to make plants for supplying large quantities of oxygen to metallurgical industries at low cost."

Post war improvements in the art of air liquefaction and rectification have made rapid strides in effecting a radical reduction of the initial air compression and as power consumption is the major cost item of oxygen production it is readily appreciated the influence reduced pressure makes in production cost of oxygen as well as lower cost of plant equipment. Lower plant cost is further realized when producing gaseous oxygen of 95% purity with recovery of 95% of the oxygen content of the compressed air in contrast with the high oxygen loss entailed in rectifying oxygen to a purity of 99.5%.

Air liquefaction plants producing 95% purity oxygen, located on the site of consumption, can provide gaseous oxygen at a plant production cost of $3.50 per net ton with power at ½ cent/K.W.H. and $5.00 per net ton with power at ¾ cent/K.W.H. when producing at the rate of 150 tons daily from three single units, capacity each of 50 tons. These oxygen costs are equivalent to 15 cents and 21 cents per thousand cubic feet respectively.

For producing 95% purity oxygen, air liquefaction and rectification plants design, plant construction costs, plant operation costs, technologists experienced on process and plant design, fabrication and operation also patent protection covering process and design are available.

800/1000 B.T.U./C.F. Carburetted Blue-Gas

Public Utilities distributing natural gas are confronted with fluctuating and curtailed gas supplies insufficient for peak load demands as well as continually increasing cost of gas. A substitute gas is required to meet distribution demands.

The flash system of gas generation producing carburetted blue-gas will use 180/220 barrels heavy-oil and 210 kilowatts connected power per million C. F., 800/1000 B.T.U. gas per 24 hours, an industrial power consumer of the first magnitude. Plants for the flash system of gas generation will not be under roof as is the present gas plant practice but will be out-of-doors type of construction. The operations will be regulated by switchboard controls, similar to the control operations of modern power plants.

Cracking Heavy-Oil to Fixed Gas Enrichment

In cracking oil to gas enrichment, heat-intensity and duration of time-of-contact with the maximum temperature are variables unknown to the gas maker.

As the temperature zone required for carbureting lean gas is considerably higher than the temperature zone of oil refinery practice to the co-relation of heat-intensity and time-of-contact in the higher temperature gas zone, of little interest in oil refining, has received scant attention by hydrocarbon technologists.

Cracking oil to fixed gaseous hydrocarbons requires definite input to the oil of energy in the forms of heat at definite heat-intensity.

Heat-intensity and time-of-contact regulate the thermal value of the fixed gas as well as the conversion of oil to gas and can be controlled to convert practically all the oil to gas to the practical exclusion of drip oil and tar formation, products of polymerizing reactions of the simpler hydrocarbons, the result of prolonged heating.

Part of the energy input to the oil is supplied by pre-heating the oil in pressure pipe stills. The heat deficiency required to crack the oil to fixed gas enrichment is supplied by the blue-gas which contains heat for this purpose in excess of its carbureting temperature.

Oil heavier than gas-oil is used for generating blue-gas from oil and oxygen. Blue-gas enriched with 1600 B.T.U./C.F. gas by the flash system of cracking heavy-oil in the hot blue-gas produces

	540 B.t.u./ C.F.	800 B.t.u./ C.F.	1000 B.t.u./ C.F.
CO	39%	30%	21%
H_2	37	30	23
Paraffins	7	15	22
Olefins	10	20	31
$CO_2 + N_2$	7	5	3
	100%	100%	100%

Technical data support and cracking tests confirm this flash system of generating carburetted blue-gas from heavy-oil and oxygen. These gas operations are subject matters of patents and patent applications.

The Use of Manufactured Gas in Industrial Bake Ovens

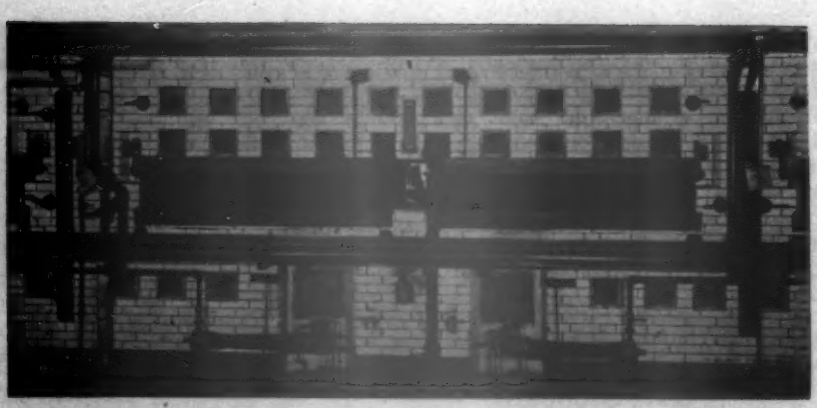
By J. Fremont

Manager, Gas New Business Department, B.C. Electric Ry. Co., Ltd., Vancouver, B.C.

FOR the past several years, one of our largest local bakeries has been using a Baker Perkins gas-fired travelling oven, in which they have baked an average of one-half million pounds of bread per month. This oven has always given satisfaction, being efficient and economical to operate, the average monthly gas consumption being approximately 700,000 cu. ft.

In addition to this oven, they have a battery of seven Petersen ovens, with two fire-boxes to each, which were fired with oil, using steam for

Paper read before the Twenty-Eighth Annual Convention of the Canadian Gas Association, June 10-11, Quebec, Can.



Close-Up of One Oven with the Two Fire-Boxes, the 4" McKee Standard Gas Injecting Tube with Atmospheric Sticktite Nozzles, the Oil and Steam Connections

atomization. The amount of oil used in the bakery was approximately 6,000 gallons per month, oil selling here for seven cents per gallon.

Owing to exceptionally keen competition, mostly from Department Stores, who on certain days sell bread at cost or less as a special attraction to induce store traffic, the larger bakeries have suffered a decrease in output, and in consequence were anxious to reduce their operating expenses. Naturally the question of fuel, being an all-important one, was very carefully analyzed.

After a thorough survey of the customer's requirements, we offered to reduce their existing rate, provided they would change over from oil to gas in the Petersen ovens. For gas supplied for this purpose we quoted a special low price based on a surplus gas rate. This special rate is subject to a clause giving the Company the right to discontinue the gas service at twenty-four hours' notice, in case of threatened shortage, due to inadequate transmission or delivery facilities. We also have an arrangement whereby the price of gas is increased proportionately in the event of an advance in the price of fuel oil.

With this arrangement, it was necessary to leave intact the oil-burning equipment, so that it could be brought into operation in the event of gas supply being shut off.

To make this conversion, we installed in each of the fourteen fuel boxes a 4" McKee standard injecting tube with atmospheric mixer and sticktite nozzle.

We have a 6" gas line piped from the meter room directly to the ovens, and this line feeds a 4" manifold running the entire lentgh of all the ovens. From the 4" manifold a 2" drop pipe supplies two burners (as per sketch). These burners were carefully bricked in, so that all unnecessary secondary air is excluded. They have been working very smoothly, giving off an exceptionally clean and incandescent flame.

The average pressure at the main is six inches, which drops to three inches at the burner. Gas is metered through two 500-B ironcase gas meters, having a capacity of 10,000 cu. ft. each per hour. The ovens are brought up to a 500 degree temperature each day, which takes about three and one-half hours' firing. During the period that the ovens are not in use, they are not allowed to drop below 400 degrees.

So far, the average gas consumption per hour per oven has been approximately 1,900 cu. ft. for an average of 5 hours per day. This we expect to reduce when the engineer in charge gets more accustomed to operating the oven dampers to meet variable atmospheric changes.

The complete installation of burner equipment cost approximately $980.00, and was completed at odd times over a period of two weeks in order that the baking operations would not be disturbed.

The bakers have stated that they consider they are getting a much more uniform temperature over all the hearth baking space than when the ovens were fired with oil.

The annual consumption of the travelling oven was approximately 9,000,000 cu. ft.

Estimated annual consumption of the Petersen Ovens, 15,000,000 cu. ft.

Taking into consideration the saving of steam for oil atomization, power for the fuel-oil pump and labor saving in flue cleaning, plus a smoother baking operation, the new installation ensures us of a greatly increased consumption.

Section of Meter Room, Showing Compressors Used in the Operation of Baker Perkins Travelling Ovens

Before The Department Of Public Utilities Of The State Of Arkansas

In the Matter of an Investigation, on the Motion of the Department, of the Formulation and Promulgation of a Rate Plan Providing for the Reduction of Rates for Electric Service to Residential and Commercial users in the State of Arkansas.

ORDER

At a session of the Department of Public Utilities, held in the City of Little Rock, Arkansas, on the 8th day of June, 1935.

This Department has observed with much interest the progress being made by various State Commissions and Utility Companies in devising and instituting various plans for reduction in rates for electric service, particularly those plans which involve features calculated to stimulate the use of electric service and indirectly stimulate the manufacture and sale of utilization devices and appliances.

Having in mind the necessary delay and tedium of ordinary valuation and rate making procedure and recognizing the need for immediate beneficial reforms in electrical rate structures and their application, this Department has reviewed and studied the available reports of experience and results of the various means devised to enable the users of electrical service to increase their consumption without greatly increasing the cost to either the buyer or seller. This Department is unanimous in its conviction that such beneficial reform can be expedited through the adoption of the principles involved in a rate plan variously styled "Objective Rate," "Low Cost Rate," etc. For the purposes of this order, a brief explanation of the intent, application and effect of this plan is offered:

Intent— The intention of the designers and originators of this form of rate was to enable the use of additional service at a lower cost without seriously impairing the revenue and earning of the utilities. In other words, a plan that would enable the user to use more energy for the same money, if he so desired, but assuring that the user would contribute the same or only a slightly smaller amount of revenue for the same or less use, it being recognized that considerable added service may be delivered for a moderate increase in revenue.

Application— Various applications of the foregoing principle have been adopted for various localities by the various commissions and utilities, but such plans are essentially as follows:

(1) A "base" period is chosen, upon which the application of immediate and objective rates is based. This base period may be the twelve months immediately preceding the institution of the "objective" plan.

(2) An "Immediate Rate," lower than the existing rates, is formulated in order to provide some reduction to all customers.

(3) An "Objective Rate" is formulated, upon which all bills for quantities of service in excess of that used during the base period are calculated. The objective rate is such that a material increase in use may be had with no increase in the bills over the corresponding month in the "base period." For use in quantities in excess of those which would result in a bill equal to that of the same month in the base period, the objective rate would result in only a nominal increase in the amount of the bill.

Results Attained— In those areas where this plan has been adopted and applied, there has been a marked increase in use of service, with an accompanying reduction in the total amount of the bills.

Critics of this plan have made the point that it discriminates against the present large users of service in that no substantial reduction is provided for those users who now approach the maximum attainable economical use of service. Various suggestions looking toward the elimination of this apparent discrimination have been made and some commissions have dismissed the element of discrimination as insignificant in comparison with the general benefits and as tending gradually to disappear.

This Department has authority, under Section 19 (1) of Act 324 of the Acts of 1935, to "find and fix just, reasonable and sufficient rates to be .... demanded by any public utility." In the exercise of this authority the Department recognizes that no one rate will or can at this time be made that will fit the diverse conditions existing in different parts of the State. The Department may, however, lay down the general principles by which all rate schedules shall be governed. The deliberations of the Department have resulted in the conclusion that it is justified in specifying the general principles to govern rates to the users of such service in this State. The Department is convinced that the adoption of the so-called "objective" rate plan will result in substantial benefit to both the purveyors and users of residential and commercial electric service. For the purposes of this order, specifications for such rates are hereby offered:

1. That each and every electrical utility operating in this State submit for approval new rate schedules for residential and commercial service, embodying the following general features:
   - (a) An immediate rate that is in general substantially lower than existing rates.
   - (b) An objective rate to be coincidentally applied that is substantially lower than the immediate rate for all consumption in excess of the base period which for the purposes of this order shall be taken as the months of the year of 1934 provided that
   - (c) A reasonable minimum base consumption may be used.
2. That for the purpose of fixing

and applying rates the element of community size be recognized by classification of communities in the following groups:

3. That the base differential in the cost of service to communities of the foregoing classes be recognized by base initial charges varying in increments of 25c per customer per month from the largest to the smallest class of community.

4. That all unrestricted service shall be rendered through one meter and billed in one account.

5. That the demand element of the cost of service be recognized as follows:

(a) *Residential Service.* This class of service shall be divided into two groups: (1) Those customers having a load consisting of devices no one of which is larger than 1 KW and (2) Those customers whose loads include devices of an individual rating of more than 1 KW.

(b) *Commercial Service.* This class of service shall be divided (1) in increments of one KW and the unit demand to be determined by a factor of 1.5 to be applied to the rating of the largest individual device in use by the customer for those customers with demands of five KW or less and (2) by measurement for those customers having greater than a five KW demand. (3) Power factor may be recognized by a suitable increase in the demand element for those cases where gaseous tube devices having inherently low power factors are used.

This Department emphasizes that the plan proposed herein, if adopted, will not hinder or alter the Department's present or intended investigations of the reasonableness of existing or adopted rate levels.

The Department recognizes that the institution of rates based on the foregoing principles will involve many problems varying among the several utilities. We believe, however, after a study of present rates, that the public interest demands the immediate investigation and adoption of some such general plan.

IT IS THEREFORE ORDERED: That on June 26, 1935, at 10:00 A.M., in the office of the Department, a hearing will be held at which all public utilities rendering electric service in this State shall appear and show cause, if any they have, why such plan or some modification thereof should not be made effective. At the same time and place users of such service may also appear and be heard.

BY THE DEPARTMENT.

Inducement Rate Plan

Based on a New Unit—The Kilowatt-Hour Equivalent

This new rate plan has two important and interesting features. (1) It is an objective rate plan. (2) The objective schedule is really a thermal rate using a unit exactly equivalent to the electrical kilowatt-hour. While strongly advocated by Mr. Donald Henry in a paper which appeared in the May issue of the Journal this is the first instance where such a unit has actually been used.

THE following rates became effective June 1, 1935, and apply to—North Carolina Gas Company serving Lexington, Thomasville, Erlanger, Reidsville, Leaksville and Spray, N. C.

Henderson & Oxford Gas Company serving Henderson and Oxford, N. C.

Elizabeth & Suburban Gas Company serving Elizabeth City, N. C.

Schedule "F" Domestic Rates

1. Applicable for all domestic purposes in private residences, including individual apartments. It is not applicable to service in boarding or rooming houses or in establishments operated for gain or profit.

2. Schedule of Rates:

For the first 77.6 K.W.H. Equivalents (500 cu. ft.)—$1.20 net.

For the next 77.6 K.W.H. Equivalents (500 cu. ft.)—.0103 per K.W.H. Equivalent—(16c per 100 cubic feet).

For all over 155.2 K.W.H. Equivalents (1000 cu. ft.)—.0084 per K.W.H. Equivalent (13c per 100 cu. ft.)

3. These rates are net. Gas will be charged for at gross rates which will be one cent per 15.52 K.W.H. equivalents (1c per 100 cubic feet) more, if bill is not paid on or before the 10th day after rendition of bill.

4. Application of Inducement Rate:

(a) A base bill will be established for each customer in the following manner:

Class 1. For customers connected prior to June 1, 1934:

The base bill for any month will be the amount of the bill of the corresponding month of the 12 months preceding June 1, 1935.

Class 2. For customers connected subsequent to June 1, 1934:

The base bill will be the average bill of the months prior to June 1, 1935 for each month coresponding with the month of the 12 months preceding June 1, 1935 during which customer was not connected; after which customer will come under Class 1.

Class 3. For new customers not connected prior to June 1, 1935:

The base bill will be the bill applicable under Schedule "A" for 232.8 Kilowatt Equivalents (1500 cu. ft.) Note. The cost of 1500 cubic feet under Schedule "A" is $3.08 net.

5. Whenever the customer's bill for gas for any month based on the inducement rate is less than the base bill, gas will be charged for in accordance with the Schedules applicable to the service rendered.

The old rate schedules, which now become the "Immediate Rates," are—

SCHEDULE "A" GENERAL SERVICE RATE

500 cu. ft. or less per month	$1.30
Next 500 cu. ft. per month	18c per C.
Next 1,000 cu. ft. per month	17½c per C.
Next 3,000 cu. ft. per month	16c per C.
Next 10,000 cu. ft. per month	15c per C.
Next 10,000 cu. ft. per month	13c per C.
Over 25,000 cu. ft. per month	11c per C.

SCHEDULE "B" COMBINATION RATE

1500 cu. ft. or less per month	$3.10
Next 500 cu. ft. per month	17c per C.
Over 2000 cu. ft. per month	13c per C.

New Officers Michigan Assn.

New officers of the Michigan Gas Association elected at its annual conference held in Grand Rapids, Michigan, June 20, 21 and 22, are as follows:

President—D. H. Frazer, President Battle Creek Gas Company, Battle Creek, Michigan; Vice-President—Newell Loomis, Detroit City Gas Company, Detroit, Michigan; Secretary-Treasurer—A. G. Schroeder, Secretary Grand Rapids Gas Light Company, Grand Rapids, Michigan.

Domestic Gas Utilization Water Heating Division

Hot Water—How Much?

By
Charles W. Merriam, Jr.
Div. Commercial Manager, Consolidated Electric and Gas Co.,
Roanoke, Va.

PART III

STRANGE to say, the question of how much hot water must be delivered from a specified heater in order to supply the use of a given domestic customer is seldom pondered by an actual user or by a prospective buyer. And what is even stranger than this is that the normal gas salesman is seldom able to offer any genuine concrete assistance (i.e., actual gallonage at a stated temperature) towards the solution despite its all-important bearing on the water-heating problem. It is self-evident that if we knew the following essential factors listed below, the answer to the question of the gas consumption per mo., and hence to the operating cost of an automatic gas water heater in a particular home could be rather easily arrived at:

1. The quantity of hot water to be delivered from the heater.
2. The temperature required at the faucet.
3. The average temperature at the cold water inlet to the heater.
4. The "all-on" thermal efficiency of the heater.
5. Standby loss of the heater.
6. The heat loss in the piping system.

Read these six conditions over again, pondering the significance of each—this is the core, the very essence of every individual case. In this and the two following serial articles we will explore into and discover how simply and easily approximations of a reasonable degree of accuracy can be made for each separate part of the problem as stated above.

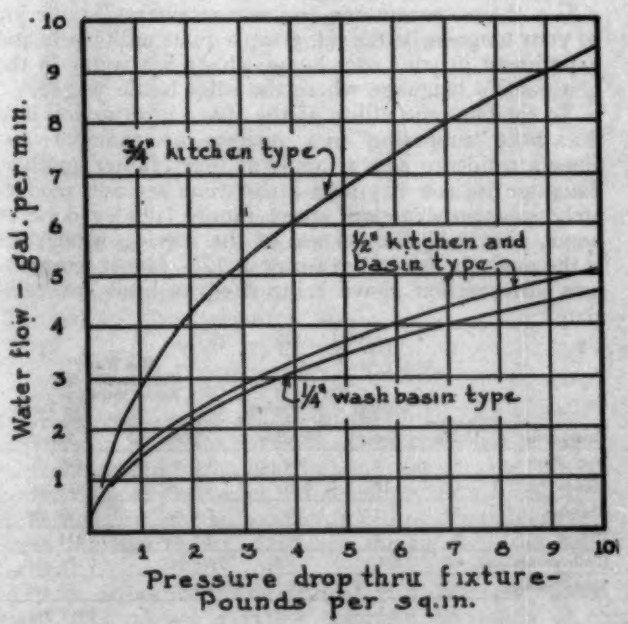
Of the elements entering into monthly cost of hot water service, the only really mystifying one is the first: namely, the required quantity of hot water actually delivered from the heater. It is not quite as bad as the question, "How many rails are there in a great big pile?" but almost as bad on the surface. Let's consider the prominent factors in determining how much hot water any customer will probably use in an average month, summarized briefly below:

1. Average number, sex and age of residents.
2. Number of servants, part or whole time.
3. Personal habits of bodily cleanliness.
   a. Number of times hands and face are washed.
   b. Number of baths and/or showers taken.
4. Proportion of personal clothes and family wash done at home.
5. Method of washing and rinsing dishes.
6. Previous method of hot water supply.
7. Economy or waste in the use.
8. Amount of cool water drained from the piping system before hot water arrives at faucet.
9. Hydrostatic pressure of water at faucet.
10. Leaking hot water faucets—how much?
11. Hot water temperature at delivery point.
12. Customer attitude as to reasonableness of operating cost.

The summation of these elements conditions, in fact these are the determining factors requisite to estimating the probable quantity of hot water to be delivered by the heater to any certain domestic customer, presuming that the automatic heater installed imposes no restrictions on the use because of capacity limitations. And even then there are a lot of "buts" and "ands," but now we're ready to "get down to cases."

The following tabulation shows the total quantity of water delivered from ordinary domestic plumbing fixtures "on full," expressed in gal. discharge per minute classified according to generally accepted flow characteristics:

	Fair	*Good*	*Excellent*
Wash Basin	2	3	4
Bath Tub	3	4	6
Shower Bath 4" Head	4	6	7
Shower Bath 5" Head	5	7	9
Shower Bath 6½" Head	6	9	11
Kitchen Sink	2	4	6
Shampoo Spray	½	1	2
Pantry Sink (high goose neck)	2	2	3
Laundry	4	6	8



And believing that no aspect of a situation is complete without an illustrative picture, the following chart is included to show varying water discharge from common fixtures at varying pressures:

It is manifest that all water pressure existing at the inlet of a fixture is lost upon discharge therefrom. Note for instance that a ½" kitchen faucet will pass 3 gal. per min. at a 3 lb. drop and 5 gal. at 9.5 lb. drop, or a 60% increase. When water pressures are excessive the detrimental ecects of carelessness in "hot" faucet manipulations or of leaking fixtures are accentuated.

Start visualizing water quantities in terms of household usage—for example to draw 20 gal. water in a tub with good flow takes 5 min. Incidentally, that same 20 gal. at 8.33 lb. per gal. weighs 167 lb.—quite a tote from the basement to the second story*. Or think of drawing 2 gal. of hot water at a mere turn of the faucet for that dish washing ordeal in only 30 seconds. Once again if that thoughtless maid leaves the faucet running as a cheerful accompaniment to a 4 min. mopping operation, some 16 gal. of hot water have migrated with the aid of gravity to the sewer drain.

To pursue these household uses still further in terms of gal. here are several pertinent facts worth imprinting indelibly on your mind:

1 Small wash basin full holds 1 gal.; and large basin 1.7 gal.

1 average sized dish washing requires about 2.2 gal. of 125° F. water, or 0.7 gal. per meal per person.

1 medium sized dish pan holds 2 gal.

1 medium sized tea kettle holds 1 gal.

1 average fair sized tub bath requires a total of about 15 gal. of water at 100° F., comprising 6.3 gal. of 65° F. and 8.7 gal. of 125° F. water. However, depending upon the habits of the bather and the size of tub, the total amount of water may vary from 5 to 30 gal.

1 average shower bath requires approximately 75% of an average hot water tub bath.

1 baby bath requires about 4 gal. of 110° F. water.

1 floor mopping requires from 2 to 5 gal. of 125° F. water.

1 medium sized pail hold 2.5 gal.

1 medium sized washing machine full holds 15 gal.

From 3 to 7 gal. per person are required for the full weekly household washing.

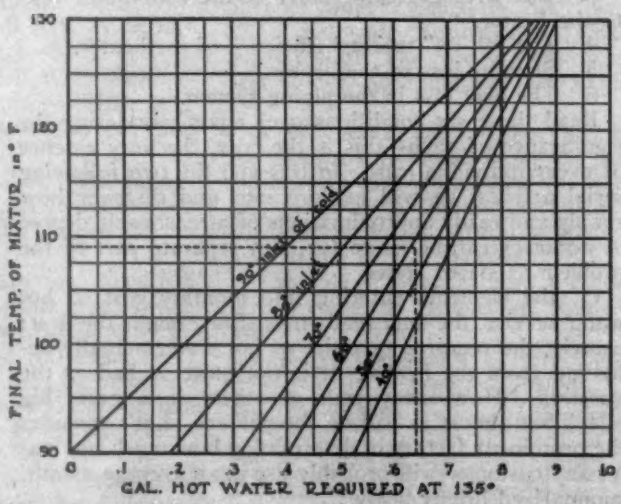
Get these conceptions and measurements at the tip of your tongue—better yet, grasp a quart milk bottle and experiment in your own home—that's hot water in the housewife's language where the sales battle waged.

To establish the utility of the above information let's do a little "supposing" in a concrete case example: Assume a residence with a family of four (father, mother, daughter 16, son 12) with a part-time servant, moderately substantial means, entire family laundry done at home, reasonably liberal use of the service, what then is the monthly use of hot water at 125° faucet temperature, information above being used as basis for estimate:

I	II	III	IV	V	VI
		Number of Operations (Col. I) in House		Hot Water Consumption for Each Operation	
Operations	Persons Using	Daily	Monthly	Each Time	For Total Use Per Month
Tub Bath	4	2	60	7.0 gal.	420 gal.
Hands	4.5	18	540	0.9 gal.	486 gal.
Shaving	1	1	30	2.0 gal.	60 gal.
Dishes	5	3	90	3.5 gal.	315 gal.
Clothes	4.5	1/7	4.2	17.1 gal.	72 gal.
Miscellaneous .	5	10	300	0.3 gal.	90 gal.
		33.1			1443 gal.

A little figuring on your part with pencil and paper will form convincing proof that the problem of "how much hot water" is susceptible to a rational approach with at least a reasonable "plus or minus" variable. It might be startling to the housewife to learn that the hot water faucets are tapped perhaps 33 imes a day—probably more—that's a lot of automatic service. Rig up a few trial examples yourself recognizing that the foregoing is rather more liberal than otherwise. There are involved in this "addition" method some splendid answers to customer questions as well as a lot of sales talk. After having sold a few jobs on which exact estimates were given, check back in a few months to the gas consumption as an aid to perfecting your judgments as to monthly quantities.

A pencil and paper will lead many a stubborn prospect to talk, figure, and analyze. The saying is rampant that once a prospect starts scratching on paper a well-informed salesman is only a bare half-step removed from a contract. The form below is suggested primarily as a guide, which made up into blank pads might be employed for estimating and sales purposes.† On the sample form the hourly hot water requirements are indicated for a normal residence on a week day. Some of the detail data concerning temperatures, etc., shown is explained in later articles. Undoubtedly the use of an estimate sheet of this sort is bristling with a scientific approach that could convey to a prospect under proper circumstances a belief in the accuracy and efficiency of the salesman and perhaps also establish an appreciation for the multitude of uses to which an automatic water heater, hidden away in the basement, would be put to in the daily household routine. By inducing an interested housewife to enumerate the various daily operations performed in which hot water is instrumental, you can readily arrive at an answer for total usage by guiding her as to probable gallonage involved in each.



IT has been stated in a preceding paragraph that the hot water quantity requirements in any given home are affected by the "hot" faucet temperature. Under the heading of the average quantity of hot water demands,

† *One group of manufactured gas properties has used a similar blank with good effect in preparing written proposals for some of the "tough nuts."*

* *Did you ever stop to consider that assuming for the moment that an average family uses 50 gal. of hot water per day or 1,500 gal. per mo. that said water weighs 12,425 lb.? Labor saving device?—think of a housewife exerting the physical energy equal to moving 6.2 tons of weight per mo. in order to have water delivered when and where wanted. It is indeed a far cry from the day of the family well and the "old oaken bucket."*

Date 6-10 19 35

Name John Doe Account No. 55-188

Address 440 Fairview St. Type of bldg. Residence

Present Appliances Stripped gas range 8 yrs. old, basement tank heater, 5 ft. elec. box 4 yrs. old

Average of last 12 months 3.0 Mcf. $ 4.20

Maximum of last 12 months 3.6 Mcf. $ 4.65

Supplementary Water Heating (coil, exchanger, jack pot, range boiler, tank htr. Describe Coil in warm air furnace and "shot gun" tank htr.

Piping itemized All ¾"-32' tank to kit. sink Size present tank 30 gals.

Condition of hot water faucets Kitchen, bad—otherwise, fair

Hour Use in Gals.* for	6	7	8	A. M. 9	10	11	12	1	3	4	P. M. 6	7	8	9	10	Total
Dishes			2					2			1	2				7
Washing Hands		3				1	1	1	1		1		2		1	11
Bath (tub)									7				6			13
Baby Bath				4												4
Shaving																
Laundry (all family)		2														2
Laundry (odd pieces)					2										1	3
House Cleaning					1	1										2
Misc. Uses					1	1	1				1					3
Total Daily Use	0	5	2	4	3	3	2	3	8	0	0	1	2	2	8	0	2	45
No. of Adults	2															
No. of Children	2															
No. of Servants	1															
No. of Baths	1															
Main Laundry done at home yes no Y																

Av. day 45 gals., Max. day 61 gals., Av. month 1350 gals.

Future av. water temp. at htr. inlet 65 °F (summer)

from coil 86 °F (winter)

Minimum temp. desired at faucet 130 °F

Required thermostat setting in htr. 140 °F

Temp. rise 65 °F (summer), 45 °F (winter)

Btu. gal. 3375 (summer), 2875 (winter)

Present W. htg. gas, Mcf. per mo. 1.0 (summer), .5 (winter)

Estimated heat loss in new piping system 1 Mcf. per mo.

Est. av. mo. gas consumption for hot water purposes

4 Mcf. (summer), 3.3 Mcf. (winter)

Net added to present mo. gas use 3 Mcf. Net added summer cost $ 2.70

2.7 Mcf. Net added winter cost $ 2.43

General Comment: Wants to provide capacity for doing family wash at home. Present tank htr. very wasteful, not used except for baths.

Recommendation: Size 30 gal., Heat Input 4500 Btu. per hr., Thermostat 140 °F., Rewasher hot faucets, leave coil intact, connect from rge. boiler to new htr., run copper tubing to kitchen

By E. C. F.

* Show hot water only, not mixture, for average day.

Figures and reading in bold face type indicates data to be supplied by salesman.

the faucet temperature is obviously of paramount importance in that the higher the temperature the less will be the requirements of hot water in gal. in order to obtain a mixture with cold water at the temperature fianlly desired. Conversely the less the temperature at the hot faucet the greater the gallonage needed to achieve a given result. And it is results (the final degree of hotness of the mixture) that Mrs. Housewife is mostly interested in.* Accordingly two simple illustrative charts are included herewith showing the basic temperature-quantity relationships between: (a) water discharged from the "hot" faucet, (b) water from "cold" faucet, and (c) that of the final mixture desired.

The dotted lines in the foregoing indicate its intended use; to wit, that with 133° F. water from the "hot" faucet (vertical on left) and with 71° F. from the "cold" (curved lines), a total of .71 gal. of hot water are required to produce a 1 gal. mixture at 115° F. Note that in the foregoing it is presumed that the temperature of the resultant mixture is fixed.

The next example illustrated indicates by the dotted lines that if the resulting mixture temperature (vertical on left) is 109° F. and the "cold faucet" temperature (angular lines) is 58° F. that .64 gal. of hot water at 135° F. is required to procure 1 gal. of the mixture. This process may be reversed at will so that with the "hot" at 135° F. and the "cold" known it is possible to ascertain the resulting mixture temperature by adding a known quantity of hot water—thus to secure 25 gal. of water for a bath at 102° when 135° F. water is procurable from the heater and 70° F. from the cold tap the chart indicates that .48 gal. of "hot" per gal. of mix are necessary, hence $.48 \times 25 = 12$ gal. of "hot" will be used for the bath.

The foregoing two charts limit calculations by necessity to a fixed temperature of the mixture and of the "hot" faucet, respectively. If an answer is required in which there are three unknowns, it is unfortunately unavoidable to introduce (with apologies) a little algebra into the situation. Those mathematically inclined might regard the following hieroglyphics:

Let x = number of gal. of hot water required to obtain of mixture.

a = temp. of "cold" faucet.

b = temp. of "hot" faucet.

c = temp. of mixture.

$$x = \frac{c - a}{b - a}$$

or in another form $c = a + x(b-a)$.

That looks pretty foreboding but let's assume that the temperature of "cold" is 60° F. = a, that the hot is 140° F. = b, and that the final mixture is 100° F. = c, then substituting in the above equation:

The gal. of "hot" required =

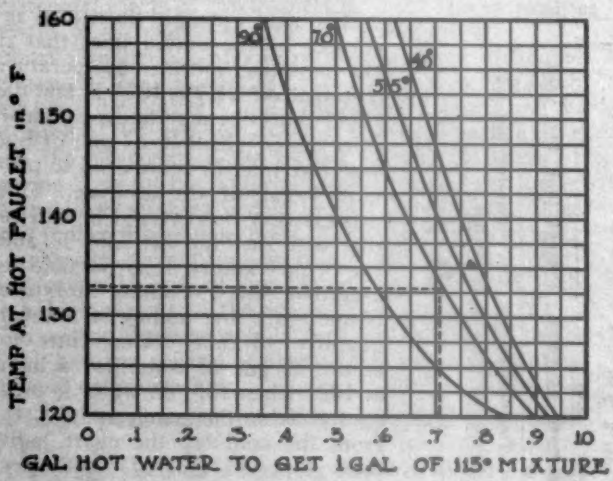
$$x = \frac{100 - 60}{140 - 60} = \frac{40}{80} = .5 \text{ gal.}$$

So now you are all set in this regard. Due to the absorption of heat into the walls of the container of the final mixture and to the heat loss into the air, the mixture must usually have an initial temperature 5° F. to 10° F. higher than the average mixture desired (witnesseth the heating up of a room during the drawing of a bath).

A later article on "The Use of Hot Water in the Home" will contain a rather complete discussion of,

* *Electric storage water heaters frequently carry a thermostatic setting of very high temperature (up to 185° F) in an effort to compensate for relatively small storage capacity and low wattage input.*

among other things, the temperature range of hot water best suited to various household purposes. It remains then to consider here the probable range of temperatures encountered in water flowing from the cold faucet. The most casual observer realizes that summertime tap water is warmer than in the winter. To establish this basic seasonal relationship your attention is invited to the following graph showing for a single community the monthly mean atmospheric temperature

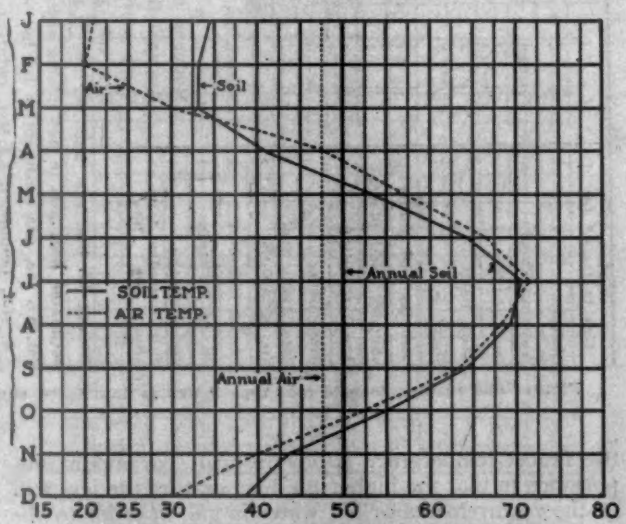


and also that of the ground at 18″ depth* which very nearly approximates that of the water received from most residential service lines:

Some exceedingly interesting and important truths are deductible from this chart. Note the seasonal differences between ground and air temperatures in Aug. through to Feb. inclusive, the ground being warmer than the air whereas in other months during the year the reverse is the case, illustrating thereby a perceptible seasonal lag caused by the ground responding less rapidly to temperature fluctuations than the atmosphere. Observe also the startling monthly difference in what in reality is the incoming water temperature between say in the months of July and Mar. which are respectively 70.2° and 33.1° or 37.1° difference. In this chart is forceably emphasized why May (53.1°) gas bills for water heating are higher than Aug. (69.3° assuming equal gallonage. Referring to the preceding chart on "Gal. Hot Water Required at 135°" it can be seen that to secure 105° final mixture with 69.3° cold water that .52 gal. of hot are needed whereas with 53.1° cold .62 gal. are needed, or 19.2% more hot to secure identically the same final results—hence variable inlet water temperatures directly explain variable gas consumption. In addition to this account must be taken of the fact that due to the lower inlet temperature 69.3—53.1=16.2° F. the water must be raised in the heater through a greater temperature rise. Assuming a storage of 135° this latter amounts to (69.3 — 53.1) ÷ (135 — 69.3) = 24.7%. In other words the conclusion can be drawn that under the circumstances recited, the same effective gallons of hot water involved a gas cost of 24.7 + 19.2 = 43.9% more in May, as a rough calculation, than in Aug. This is a frightful shock to furnace coil users who start gas consumption for hot water in the spring—perhaps the foregoing will help the service and complaint desk man to rationalize with such irate customers. However, normally a greater number of hot baths are taken in the summer which acts to a degree as an offsetting factor to the higher gas consumption per gal. of the final mixture used. Altho this chart depicts conditions in only one locality it is probable that the relationship there between the twelve months and the mean annual is fairly representative of the country at large with the possible exception of those areas immediately bordering upon the oceans which have a tendency toward causing an evener atmospheric temperature.

There are several other factors under "Hot Water —How Much?" that are worth pondering. It is obvious that a family formerly living in an apartment affording literally oceans of overly hot water included along with the rent check will, upon purchasing an automatic gas heater for a new home, use more gas than a family just acquiring an automatic to replace a previous tank heater considered by them to be expensive. Likewise a 24 year old unmarried daughter will use more hot water than a 12 year old son. The presence of a baby in the home will increase hot water uses usually more than an adult. Servants, especially negroes, are flagrantly careless abusers of this or almost any automatic service. In short water heating estimates must be tinctured with a little common sense. One shrewd salesman is reported to always ascertain other utility bills on the theory that a relatively high electric bill for lighting in a home prophesies the probability of a correspondingly high gas water heating bill.

And now we come to the phase not of hot water



MEAN MONTHLY TEMPERATURE
RECORD OF GROUND AND AIR TEMPERATURE
TEST IN E. LANSING, MICH.

usage but of waste which with unfortunate frequency is of extreme importance. Two chief losses are: 1. Leaking faucets, 2. Hot water left in pipes after closing a faucet, said hot water having a tendency to cool off before the next turning on of the faucet (this latter is discussed in detail in a later article on "Hot Water Piping and Installation"). With regard to the former, leaky fixtures, the accompanying picture is a visual

(Continued on page 48)

** This is based upon experimental data arrived at in loam soil in East Lansing, Mich., for which the annual degree days (65° basis) are reported to be 7112. In this series of tests the variation of ground temperature is proved to be subject to surprisingly little fluctuation due to depth or to type of soil covering—for example, the difference in mean annual temperature between 2″ and 18″ depths was only 1.0°F and the maximum difference of the mean annual at 12″ depth of four types covering, i. e., loam, gravel, sand and clay, was only 0.5°F. This tends definitely to demonstrate that essentially all of the heat received from the sun is in the form of radiant energy. Attention is called further to the fact that the mean annual temperature of the soil is 50.0°F and 47.3°F of the air. If it is contemplated to employ the gas water heater only during periods of non-operation of the furnace coil, recognition should be given to the seasonal mean ground temperature, May thru Sept., of 64.3°F which is 64.3 — 50.0 = 14.3°F higher than the annual.*

Gas Analysis: The Application Of Exact Analysis To Industrial Problems

By

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The work presented in this paper is not a planned study of the technique of gas analysis, but merely the result of often interrupted investigations arising out of some particular need in plant operation.

In 1930, at the time of the purchase of the Shepherd Gas Analysis Apparatus, there had been recently undertaken the distribution of coke oven gas at 150 lbs. pressure in welded steel mains. The following year natural gas was introduced into the territory and a year ago a water gas plant was erected for the "reforming" of this natural gas.

The above facts have been mentioned to point out how rapidly the picture of the gas industry has changed and coincident with it the demands on gas analysis for reliable information pertaining to these gases of widely varying composition.

Sampling of Gases for Analysis

THE sampling of gases for analysis is very rarely the simple matter of transference of a portion of the gas from one receptacle to another, for accompanying this transference is the question of time, volume, pressure, velocity of flow and other factors which must be taken into consideration before a representative sample can be taken.

The term "representative sample" has been used on the assumption that definite information is desired either as to the composition of the gas itself or to assist in the interpretation of some change in operation. It is quite apparent then, that the accuracy of the reported results, no matter with what care the analysis has been conducted, cannot exceed the accuracy with which the sample was taken.

The gases handled at the present time are as follows:

1. Natural Gas—BTU Range—960 to 1020. Variation over weeks.
2. Send-out Gas — BTU — 570. Maintained.
3. Coke Oven Gas—BTU Range 460 to 540. Variation over eight hour period.
4. Reformed Gas—BTU Range 325 to 425. Variation over four minute period.

It is readily noted that the method of sampling these gases cannot be the same in each instance.

Presented before the American Chemical Society Cleveland, Ohio. September 10-15 1934

Method of Sampling

The method of sampling these gases is as follows: Lines carrying each of the above gases are led to a piping manifold just ahead of the sample holder. Each line is equipped with two valves with a "pet" cock in between to prevent contamination of the gas being sampled. The flow of gas is regulated by means of calibrated orifices in the common line carrier, and the duration of the sample is controlled by means of a valve actuated by a Telechron clock, similar to the equipment supplied with the modern gas ranges. This control makes it possible to collect a sample of any gas, at any time during the day, and free from manual operation. The sample holder itself has a twenty cubic foot capacity, with a counter balance to adjust the static presure from 7" to ½" water pressure, and with a "dead" gas space of only fifteen cubic inches.

The holder was designed to throw a static pressure of 7" of water for one particular reason. In drawing an average sample of reformed gas there is a period in the cycle when no gas is made, that is, during the blasting period of the coke bed, and the pressure of the gas in the main at this time is that of the back pressure of the storage holder, namely, 7" of water. It is evident then that if the pressure in the main and the static pressure of the sample holder are the same during the blasting period (which is about 30% of the cycle), no sample will be drawn and the total sample will represent the gas made during the "gas make" period of the cycle. Water is used in the holder with a ¼" oil seal to reduce the solubility of the gases.

It has been found also that the composition of the gas varies during

the period between charges, i.e., from the start to the end of the period, and as an average sample is desired, the sample is timed to correspond to a multiple of this period. At the present time the charging period is 34 minutes and the sample would then be taken over either a 68 or a 102 minute period.

The sampling of the other gases is controlled according to the demands of the analysis, and the type of gas in question.

After the gas sample has been taken into the holder the weights on the counter balance are adjusted to deliver the gas at the desired pressure to the calorimeter. While the calorimeter is coming to thermal equilibrium, a tap from the same line is bleeding the gas through the purge cock on the sampling pipet, and the sample for analysis is taken during the same interval that the calorimetric test is run. The sample is taken under slight pressure to prevent contamination with air, and mercury is used for confinement.

The sampling pipet mentioned above is the "three way" stop-cock type mentioned in Research Paper No. 266 of the Bureau of Standards, and permits of a complete purging of the capillaries both in taking and discharging the sample.

Method of Analysis

A full description of the Shepherd Apparatus, and the recommended technique for its operation are given in the bulletin "An Improved Apparatus and Method for the Analysis of Gas Mixtures by Combustion and Absorption," by Martin Shepherd, Bureau of Standards Research Paper No. 266, and except for a few minor changes, the apparatus used for the work reported in this paper is the same as described in this bulletin.

Mercury is used in the sampling pipet, as well as in the burette, the weight of which required a somewhat different mounting from that which accompanied the original apparatus. The order in which the absorption pipets are arranged has also been changed and is: 1, Fuming sulfuric acid; 2, KOH; 3, Alkaline pyrogallol; and 4, the combustion pipet. In this manner the SO_3 fumes in the manifold can be removed by the gas as it sweeps through to the KOH pipet which follows the fuming sulfuric acid pipet. The conventional arrangement of third place for this pipet left about 0.20 ML space filled with SO_3 fumes after the illuminants absorption.

The natural gas which contains about 90% methane requires a rather high combustion wire temperature to completely burn the methane in a minimum of time and the heat generated was not sufficiently dissipated by the arms on the combustion pipet, so that it was found necessary to blow a stream of air against the dome and arms to prevent the melting of the Khotinsky cement which seals the connector caps to the arms.

Tank oxygen is used for combustion and conducted through a permanent copper line attached to the apparatus, to the inlet directly above the burette. Each new tank of oxygen is analyzed for its O_2 and inert content and the latter corrected for in the computations of the analysis.

The entire "dead" space in the apparatus has been calibrated according to the method recommended by Shepherd and compensated for in the calculations. This one factor alone has reduced the time for an analysis by about fifteen to twenty minutes, and how this factor is applied will be discussed more fully later.

Before an analysis is begun a sample of air about 30 ML is taken into the apparatus and its oxygen removed in the pyrogallol pipet. The remaining nitrogen is used to fill the gas space in the apparatus which has a volume of 2.87 ML.

The above procedure permits the maximum volumes of the different gases to be used for an analysis, which are as follows:

Natural Gas	= 40 ML
Send out gas	= 80 ML
Reformed gas	= 95 ML
Coke oven gas	= 80 ML

Notes on the Analysis of Tank Oxygen

In the first analyses of tank oxygen the apparatus was prepared as for a regular analysis, i.e., the gas space was filled with nitrogen and in attempting to determine the combustible components present in the oxygen, an oxidation of this nitrogen resulted, with both a measurable contraction and absorption through KOH. Subsequently, however, the gas space was filled with the oxygen itself and a combustion conducted on this gas produced no contraction nor reduction in volume when the gas was passed through the KOH after combustion. After the combustion a measured quantity of nitrogen is introduced to permit a measurement of the residue after the O_2 absorption, which otherwise would be too small to measure in the burette.

Notes on the Illuminants Determination

For the type of analysis concerned, the illuminants are determined as a group by absorption in fuming sulfuric acid which has proven the most unsatisfactory determination in the entire analysis.

Dennis[1] quoting Worstall calls attention to the fact that fuming sulfuric acid absorbs a little methane and ethane, but states that the error is negligible unless the time of absorption is over fifteen minutes. A second source[2] remarks that "by prolonged or oft repeated contact the acid (referring to 15% fuming sulfuric acid) absorbs ethane but in ordinary practice the amount is negligible except in cases where ethane is present in large proportions."

In attempting to establish the Shepherd apparatus as a standard for works operation where an agreement of at least one percent is demanded between the determined and calculated heating value and specific gravity, it was found that the solubility of both the methane and ethane in fuming sulfuric acid are neither insignificant nor does the time of contact with the acid have to be extensively prolonged.

It is realized, of course, that the type of pipet, the so-called "distributor tip," used in this work by reason of its fine dispersion plate offers a much greater rate of reactivity than the ordinary bubbling type pipet, so that this fact will have to be considered in the comparison of earlier work on this subject.

Previous to the present operation of "reforming" the natural gas, coke oven gas of 540 BTU/cu.ft. was enriched with natural gas to raise the heating value to 570 BTU/cu.ft. and this gas with a methane content of 32% showed a 2.40% "illuminants" fraction as determined by three passes through the acid in the distributor tip pipet. The "reformed" gas with a 39% methane content after an enrichment with natural gas from 375 to 570 BTU/cu.ft. showed a 0.90% "illuminants" fraction determined in the same manner, so that the greater rate of reactivity of the pipet could not account in whole for the discrepancies noted in this determination.

During the course of regular analyses, and before undertaking a systematic study of the behavior of this acid, several peculiarities were

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[1] *"Gas Analysis" by L. M. Dennis, Macmillan 1929, pg. 261.*

[2] *"Methods of the United States Steel Corporation for the Sampling and Analysis of Gases," 1927, pg. 35.*

observed. The practice was to pass the gas three times through the acid followed by a like number of passes through the KOH and measure, which showed on an average 1.10% illuminants in the "send out" gas. When the passes through the acid were reduced from three to one the average then, on several analyses, was only 0.80% illuminants with no apparent change in operation. Following this observation new acid was placed in the pipet and the percentages of "illuminants" in the reformed gas (410BTU/cu.ft.) on successive analyses were 0.13, 0.27, 0.18, 0.29, 0.26, and 0.48 with the number of passes through the acid ranging from two to fifteen and the percent removed independent of the number of passes.

A sample of natural gas of the following analysis:

CO_2	=	0.34
O_2	=	0.05
CH_4	=	90.49
C_2H_6	=	3.31
N_2	=	5.80
Total		99.99

BTU—Junkers = 960
BTU—Calculated = 960

was then subjected to the acid scrubbing in the regular course of the analysis with this result:

CO_2	=	0.35
O_2	=	0.08
Ill.	=	3.72
CH_4	=	92.45
C_2H_6	=	—3.14
N_2	=	6.54

with an algebraic sum of 100.00. This gas was given three passes each of five successive scrubbings through the acid, or a total of fifteen passes.

Comparisons

A comparison of the two analyses, exclusive of the "illuminants" fraction shows in the second analysis an increase in the CH_4 content, a negative quantity for the C_2H_6 very nearly equal to the quantity in the first analysis and an increase in the N_2 content. This latter fact is quite noteworthy for the N_2 in these and subsequent analyses is measured at the end of the analysis.

After this wholly unaccountable analysis, 95% sulfuric acid was placed in the pipet and a second sample of natural gas was subjected to the acid scrubbing after the removal of the CO_2 and O_2, the results of which were as follows:

NATURAL GAS

51 ML Sample Room Temp. 96°—Barometer 29.60

No. of Passes Thru 95% H_2SO_4	% Removed	Remarks
2 Passes	0.49	Three minute standing before reading
2 Passes	0.39	burette.
2 Passes	0.35	" " " " "
2 Passes	0.25	" " " " "
10 Passes	1.23	" " " " "
10 Passes	0.71	Burette Read immediately.
* 10 Passes	2.59	" " "
* 10 Passes	3.88	" " "
10 Passes	0.59	" " "
10 Passes	0.10	" " "
10 Passes	0.12	" " "
		" " "

*Water vapor removed

This analysis was not completed but it illustrates the fact that a portion of the gas was removed on each series of passes through the acid. Those marked with an asterisk (*) unquestionably represent the removal of the water vapor from the gas. This is indicated by averaging the quantities immediately preceding and succeeding these passages, and deducting this from the total of the two passages thus: $(2.59+3.88)-\frac{(0.71+0.59)}{2}=5.82\%$. The gas was at a temperature of 96° F and the barometer read 29.60" HG, so that the gas if saturated would contain 5.74% H_2O vapor. It is the practice during an analysis to maintain a sufficient quantity of water on top of the mercury in the burette to keep the walls wetted so that the gas is always measured under a saturated condition. At the point in this analysis where the removal of the water vapor was indicated it was noticed that the burette wall and the mercury surface were entirely free from water and remained so for the balance of the test. On the basis of these facts the quantities removed by the acid cannot be attributed to removal of water vapor except in the cases noted.

Second part of the above paper will appear in the August issue.

An Electric Gas Generator

By
Ivar Hole
Ingenior, M.N.I.F., Oslo, Norway

THE generation of gases or treatment of such by means of electric energy has been the subject of considerable study and work, and a number of patents have been taken out for devices in which to carry out the reactions.

Broadly stated, the object of using electric energy for such purposes may be said to consist in:

1. To obtain a continuous supply of the cleanest possible gas, for instance water gas.
2. To effect chemical transformations of gases, for instance the conversion of carbon dioxide into monoxide.
3. To raise the temperature of gases.
4. To convert electric energy into combustible gases, i.e., an energy transformation.

The last named item may have actuality in cities with a surplus of cheap electricity, where the demand for gas for household or technical uses exceeds the capacity of the gas works.

The main common characteristics for an apparatus in which to accomplish these things may be stated as follows:

1. Simple and reliable design and operation.
2. Small maintenance and repair costs.
3. Continuous operation.
4. Complete gas reactions.
5. No electrode consumption.
6. High thermal efficiency.

(Continued on page 38)

Paper read before 28th Annual Convention, Canadian Gas Association, Quebec, Canada, June 10th and 11th, 1935.

Why Truck Poster Advertising?

By
Stuart Bratesman
Manager, Display Dept.
Boston Consolidated Gas Co.

UNTIL a few years ago, most gas companies paid little, if any, attention to the possibilities of using the sides of company trucks as a medium to bring educational and sales messages to the public. It is only recently that companies outside certain metropolitan areas have used this valuable advertising medium.

In the hope of bringing the advantages of this inexpensive, but far-reaching, activity to the average sales or advertising executive, the writer is taking these lines to explain in detail certain major factors in preparing this type of advertising; and just how the small gas company can use it to good advantage.

Contrary to some opinions, truck advertising is not necessarily an expensive or ballyhoo type of display. It can be planned and executed in a very conservative, but effective, manner. Dignity is not discarded. Whether your fleet is in the dozens or hundreds, it will pay you to look into this medium.

To begin with, the simplest and sturdiest type of board is a sheet steel kind, stamped in one piece. In quantity, these metal boards cost very little. They should be painted to resist rust. The painting and fastening on your trucks can be done by your own men. Black enamel paint has proven the best and most effective as a color background. The lip which holds the poster in the board makes a nice border in this color. It sets off the design as it passes one on the streets.

Accompanying these lines are four photographs illustrating this type of metal board and how various poster designs look when placed in them. The shot of the insertion clearly shows how simply it can be done, more so than a hundred words.

At one time, pasted posters were used in this type of advertising. These pasted posters were similar to the outdoor billboards used all over the country, but it proved too expensive and lengthy a job to cover an entire fleet correctly. With this new cardboard type of poster and metal frame, any person can insert the new poster. Two slots, near the bottom of each side lip, allow the poster to be inserted. The weight of the poster will then drop it down inside the lower lip and hold it firm in any kind of weather. At first, these metal boards were loaded from the ends, but after losing half of the posters along the streets on a windy day, the lower slots were used.

The most successful type of truck poster that this writer has used, or seen, is a heavy cardboard type. The design is printed in silk-screen process, from an original drawing, exact size. Varnishing the back and edges insures long life in rainy weather. This type of poster will last over a month, in any kind of weather.

The advantages of truck advertising are many. In the first place, remember that your trucks are on the streets of the territory you serve most of the working day. People who seldom pass your display windows will see, and read, truck advertising. You also have the chance of blanketing your territory with coordinated campaigns or sales. Truck advertising finishes off the complete story started by newspapers and displays. Seasonal themes can also be used to good advantage.

Here are a few poster ideas, shown with this article. Keep your messages quite simple and direct. Use brilliant and contrasting colors, with lettering that is noted for its legibility. Don't go in for trick theatrical effects. Remember, people can't read more than the eye can accept at a glance, as the truck passes by.

If you are interested, the writer will be glad to furnish actual figures on the cost of such an activity. Give it a thought,—it will more than repay your efforts.

"SUCCESSFUL SELLING"

File Showing Every Potential User Of All Types Of Appliances Helps Texas Company Make Outstanding Sales Record

By
Ed C. Ricks

WHEN heads of the Texas Cities Gas Co., El Paso, Texas, set out to merchandise any specific appliance such as ranges or water heaters, they know exactly how many people the company will have a chance of selling that appliance to and who those people are. This specific information is contained in a consumer's survey report covering every residence building in El Paso.

This property did one of the best appliance businesses in its history last year and much of this volume is traced to the availability of complete information on potential markets. El Paso had a population of only 105,000 when the last census was taken and about 65,000 of the residents are Mexicans. Yet, the appliance business done last year broke down this way: 456 ranges sold, 463 water heaters, 175 refrigerators, 353 radiant heaters, 92 circulators, 56 floor furnaces, 27 radiators, 68 conversion burners, 10 central furnaces, one boiler and one unit heater.

This year, an even more intensive drive has been launched on water heaters than was used last year and indications are that sales will far exceed the previous period. Every company employee, including street department people, fitters, meter readers, meter repair department men, helpers and plant engineer, is a salesman under the merchandising system used last year and which is being carried out again this season. The plan has given the company about 100 salesmen instead of the previous eight.

To stimulate interest in the present water heater campaign, all employees have been organized into seven teams competing against each other. The force was split up into as many groups as possible to create keener competition. So that there would be no chance of partiality in groups, all employees from the manager on down were brought into a general meeting and divided up. Each of the seven salesmen was named a captain. The first captain took the first man in line, the second salesman the second man and so on until the whole staff was divided up. The largest team contains 14 men and the smallest one 11 people.

A $25 prize and a banquet was offered to the winning team. The second highest team gets $15 and the third one $10. If a man on a team that doesn't win a prize makes a good record, he will be given individual recognition. This same arrangement was used last year.

The captains of each team hold meetings with their people and give instructions on selling. The sales work of each non-selling employee is done among his friends, relatives, acquaintances and the people he buys from. If he succeeds in interesting a prospect, he makes out a prospect card in duplicate, turning in one copy and keeping one for his own file. Then, one of the regular salesmen follows up this "lead."

In prospecting by the non-selling employees as well as in the actual selling, the consumer's survey information has proved very valuable. Instead of having to ask a lot of questions of a prospect, the company employee is able to immediately approach the subject that the individual will be interested in. The employees make up lists of people they should contact and then check the file to determine what appliances each one of them don't have. During the water heater campaign, attention is being concentrated on this one item so the file saves employees a lot of time. If an employee sees that the friend he had intended to contact already has a water heater, the call isn't made. Rather, the contact is reserved for a later date when the company is "pushing" some appliance that this prospect does need.

The survey was made by the regular salesmen, aided by a special crew of six people, bringing the total up to

Form 1933—TCG—5-34

CONSUMER'S SURVEY REPORT

Route Number_____ Date_____ 193__

Name_____ Business [ ] Residence [ ]

Address_____ Town_____

Owner [ ], Tenant [ ], Number Rooms_____, Number Piped Openings_____, Number Occupants_____

Basement—Yes ☐ No ☐ **GAS APPLIANCES IN USE** Using Gas—Yes ☐ No ☐

Appliance	Trade Name	Number or Size	Type	Control (Manual or Automatic)	Insulated (yes or no)	Age	Condition

Use reverse side for remarks and other Fuel Appliances

14. Every house and apartment and business building in town was covered, the following information being obtained: route number; name and address; date and whether business or residential property; whether the owner or tenant; number of rooms; number of piped openings; number of occupants; whether or not there is a basement; whether or not gas is used, and a list of all appliances.

Information given on each appliance is: what the appliance is, trade name, number and size, type, whether the control is manual or automatic, whether insulated or not, age and condition. On the reverse side is space for a list of all other fuel appliances, the same points of information being covered here as with gas burning equipment. The latter data has proved invaluable in getting replacement business.

Appliance lists are kept strictly up-to-date. All new appliances installed are added to the list and if a customer moves, this is indicated, the change depending on whether he takes appliances with him or leaves them in the former house. When a sales order comes in, the stenographer fills out a light weight paper form giving the complete data on it. This is then sent downstairs and the information transferred to this user's permanent record card. The paper forms are the same ones used in making the original survey. Cards are used for the permanent file because of their durability.

For ease in getting a list of prospects on any one type appliance, the company has tabbed all record cards. The cards of non-users of water heaters carry one type of tab. The cards of owners of old water heaters carry another type. The cards of non-users of ranges are marked by a third color, and so on.

All appliance users have also been tabbed on the addressograph. Thus, if the company wants to send literature to all range prospects, there is no difficulty in getting together a comprehensive mailing list. The names are all ready and waiting for use.

A new term arrangement on water heaters, adopted this year, is proving highly successful. Down-payments on lower priced models—those running up to $77.50 list—are only 65 cents. Payment periods on these models are 34 and 35 months. The highest down-payments, even on models selling for $113.50, are only $1.85. Monthly payments range from $1.50 on the lowest priced units to $2.50 on the most expensive ones. The longest payment period is 36 months.

In a very successful effort to get replacement business, the El Paso property allows 15% on all heaters burning any fuel other than gas. A 10% allowance is made on old-type gas water heaters. All prices cover installation to the stub.

"The very low down-payments have proved a big asset," says sales manager Charles H. Price. "It is a case of making the prospect feel the responsibility of ownership. Nobody will hesitate to pay 65 cents down on an appliance because they feel they can't lose anything. But, once they have made that payment, they will usually go through with the deal."

During a campaign on a specific item, this company usually shows nothing else but that item on the sales floor, even placing units in the aisles where people have to go around them to go to the office. The idea is that seeing the actual merchandise on every hand further impresses the selling message carried out through other mediums.

Water Heater Rental Plan A Success In Kansas City, Mo.

By Chas. D. Greason,

Director, Publicity and Advertising,
The Gas Service Company, Kansas City, Missouri

A WATER heater rental plan is proving a business stimulus that is aiding the Kansas City Gas Company's new business department in adding a large number of automatic storage water heaters to the company's gas lines in Kansas City, Mo. The rental plan was put into effect on March 1 this year and so far this year, up to May 27, a total of 1,311 automatic storage systems have been installed by this company. The success of the rental plan is evident when it is considered that during the entire twelve months of 1934 there were only 375 automatic water heaters installed by the company in Kansas City.

Tying in with The Gas Service Company program in the rental of water heaters the Kansas City Gas Company sales department started active work on the rental program about the time Herbert C. Porter became new business manager of the Kansas City company on March 1. Mr. Porter came to the Kansas City Gas Company from St. Joseph where for many years he had been unusually successful as new business manager of a Cities Service Company electric property, the St. Joseph Railway, Light, Heat, and Power Co.

In the past few months Mr. Porter's Kansas City Gas Co. sales department has been concentrating on the rental and sale of water heaters but at the same time the salesmen have sold a large number of gas ranges and considerable gas heating equipment. During the month of April this department, along with other Gas Service company properties, featured the sale of gas ranges, tying in that month in the National Gas Range Sales Contest. In April the Kansas City Gas Company sold a total of 365 gas ranges. This company is competing again in the National Gas Range Sales Contest during June.

Herbert C. Porter, the man who is responsible for the Kansas City Gas Company's outstanding success in a water heater rental plan.

The rental plan on water heaters that is being used by the Kansas City Gas Company is the same that was put in effect in all of The Gas Service Company properties in the Kansas City territory. It is a straight rental proposition whereby the company retains ownership of the heater and credit is given for all rental payments made The rental contract carries an option to purchase at any time and it is possible to exercise the option to purchase by paying cash or by purchasing the heater on the company's partial payment plan. The rental plan extends for 60 months with rentals as low as one dollar a month, depending on the type and size of the heater. A 20 per cent discount is allowed for cash payment on the balance any time during the 60 months. In Kansas City the Kansas City Gas Company is handling the various sizes of the galvanized heaters manufactured by the Pittsburg Water Heater Company.

Newspaper advertising has been used almost exclusively as the advertising medium to inform the company's customers about the new rental plan. Advertisements of various sizes have been carried in the Kansas City Journal-Post practically every other day since the start of the campaign, while small ads have been used in approximately twenty independent newspapers in Kansas City.

A small ad telling of the rental plan has also appeared on the company's gas bills, for the past few months.

At the start of the campaign reprints of a full page ad were mailed to 40,000 domestic customers with a post card, that the customer could return to the company, attached to the ad. A large number of post cards, showing that many customers were interested in getting more details of the plan, were returned to the company, which afforded excellent leads for the salesmen in the first few weeks the rental plan was in effect.

The sales floor at the main office of the Kansas City Gas Company and the company's Country Club Plaza office sales floor have been practically devoted to the display of water heaters. These displays have attracted much attention from our customers paying their bills in the office and have also aided the floor salesmen in obtaining good leads.

Attractive window displays, featuring the plan of "Renting a gas water heater for $1.00 per month" have been effective at the company's two Kansas City locations as well as in a vacant storeroom in a fine location in the downtown district.

As a stimulus to add enthusiasm to the rental plan at the Kansas City Gas Company, Mr. Porter offered a fishing trip over the Decoration Day holiday to all members of the department if 1,000 water heater contracts were obtained by the salesmen by May 28. The salesmen reached this goal, assuring their trip, on May 9, three weeks before the time limit. Mr. Porter also promised the salesmen a dinner if 1,000 water heater contracts were secured before May 28. The Kansas City Gas Company new business manager paid off the dinner to the department on Tuesday night, May 21, while the department enjoyed the fishing trip on Lake Tanyecomo from May 31 to June 3.

The original quota set for the Kansas City Gas Company on the sale and rental of water heaters for the year was 1,700. From the fine results obtained so far in the past few months, the year's quota will be exceeded in a short time.

Besides the new business manager the Kansas City Gas Company sales department is made up of two supervisors, Russell Lemon and Don Warner, and twenty-four salesmen.

Conversion Gas Water Heater Campaign

By Ralph P. Wagner

Commercial Manager, New York Power & Light Corp., Albany, N. Y.

FOR several years our progress in the sale of gas for water heating was unsatisfactory although various schemes were tried. The sale of "bucket a day" coal stoves and of bottled gas water heaters was increasing to such an extent that we were doing little more than holding our own.

In 1933 we materially decreased our rate for gas service and at that time began a plan of renting conversion space heating equipment. This plan has resulted in increases of nearly 800 house heating installations. In spite of our lower rates, however, the sale of water heaters did not increase satisfactorily.

Early in 1934 we began experimenting with gas water heaters of the conversion type; i.e., heaters which could be applied to existing hot water tanks. During the winter of 1934-1935 we installed about 100 trial installations in customers' homes.

14. Every house and apartment and business building in town was covered, the following information being obtained: route number; name and address; date and whether business or residential property; whether the owner or tenant; number of rooms; number of piped openings; number of occupants; whether or not there is a basement; whether or not gas is used, and a list of all appliances.

Information given on each appliance is: what the appliance is, trade name, number and size, type, whether the control is manual or automatic, whether insulated or not, age and condition. On the reverse side is space for a list of all other fuel appliances, the same points of information being covered here as with gas burning equipment. The latter data has proved invaluable in getting replacement business.

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In 1933 we materially decreased our rate for gas service and at that time began a plan of renting conversion space heating equipment. This plan has resulted in increases of nearly 800 house heating installations. In spite of our lower rates, however, the sale of water heaters did not increase satisfactorily.

Early in 1934 we began experimenting with gas water heaters of the conversion type; i.e., heaters which could be applied to existing hot water tanks. During the winter of 1934-1935 we installed about 100 trial installations in customers' homes.

As a result of these experiments, on March 15, 1935 we started a rental program similar to our space heating plan. The purpose of this program was to furnish a gas burning water heating device which could be installed cheaply and which would give automatic hot water service, even though the quantity of water was somewhat limited.

Our plan provides that we will install a conversion water heater of accepted design on the existing hot water tank of any customer now served by our gas mains. The tank is insulated with 2" of rock wool in blanket form and is equipped with a combined heat and pressure relief valve.

We follow the following procedure in making these installations—

A plumber, selected by the customer, is employed to make the installation. The completed job is rented to the customer for $1 per month and, at the end of 38 months, title is given to the customer. At any time a customer desires to obtain full possession, he may do so by paying us an amount equal to his unpaid balance less 10%. Attached is a copy of the rental form.

Our results, as determined by the first 100 of these heaters installed, indicate that the average use is approximately 2,000 cu. ft. per month. Since the capacity of these conversion burners does not exceed 8 cu. ft. per hour, it is difficult to believe that we will have many using beyond a maximum of 4,000 cu. ft. per month. Although our sales program started only on March 15th, results have been astounding. Up to June 1st we have installed approximately 1,000 heaters. Our plans call for the installation of 3,000 this year and present indications are that we will reach this goal.

The Colonel's Commentary

IF the gas water heater business doesn't take on a boom, we'll miss our guess. We have just gone over more than 300 water heater advertisements from here and yon, advertisements that offer everything but the kitchen stove. Rental plans, guaranteed gas bill plans, low down-payment plans, low first cost plans and what have you. If our guess is correct, folks are just going to have to have hot water and the bath will be an actuality in the daily program, not just a topic of conversation. "When I took my bath this morning," just won't be heard any more for folks, if they heed some of these advertisements, will make the daily bath a habit and not a hope.

These advertisements by and large feature the storage type heater; many of them, however, are hitting hard on that new conversion type. That looks good to us and we are of the opinion that it's going to do things for the gas companies.

One salesman, who is doing things with this midget, carries it under his arm when visiting a prospect and it goes over good.

Here's News

The Central Illinois Public Service Co. has hit back at another industry that is out to capture the cooking and water heating business by advertising "New Low Rates for 'Full Kitchen' Use."

The advertisement from Shelbyville, Illinois, tells the whole story—a stroke as we see it in the right direction for gas. It seems to us

HERE'S NEWS!
EXTRA
EXTRA
EXTRA
Effective May 16
REDUCED GAS PRICES FOR FULL KITCHEN USE
AVAILABLE TO ALL CUSTOMERS USING A GAS RANGE & WATER HEATER FOR COOKING & WATER HEATING
Now You can easily MODERNIZE and SAVE!
Additional GAS service is LOWER in price! Now you can buy many extra hours of pleasure and ease for a few cents daily. Under reduced Gas prices for 'Full Kitchen Use' the more you use, the cheaper it becomes, —in fact, your SAVINGS over old, time and drudgery methods will help pay for additional GAS servants to complete your Home Modernization.
Inquire Now
Hundreds of central and southern Illinois families will profit by allowing lower-priced 'Full Kitchen Use' Gas service to shorten and simplify their household tasks, while enjoying added conveniences and comfort. You, too, can easily save under these new Lower Prices for additional service. Find out, today! Learn how you can modernize and beautify your home with 'FULL' KITCHEN USE' service —and how your savings will help pay for a modern Gas Water Heater, Refrigerator or Range!
Learn How Gas Heating Provides Lowest Costs for All Domestic Use
ASK ANY EMPLOYEE OR CALL AT THIS OFFICE
CENTRAL ILLINOIS PUBLIC SERVICE COMPANY

that if the gas range and gas water heater are taken out of the home the gas man has a smaller chance to install a gas fired furnace or boiler for home heating. No doubt the Central Illinois folks have arrived at the same conclusion hence this plan for "full Kitchen use."

amount of white space and a few terse sentences telling "What I Want and Why" beget immediate attention and register with women right now.

This style of advertising is gaining favor among gas men everywhere and it is our opinion that if consistent, and balanced campaign that localizes and personalizes the selling effort."

In planning such a campaign size of space may be plotted in such a manner as to give continuity and insure fair representation by scheduling the large advertisements on days when there is a heavy "run" of advertising and smaller size advertisements on days when "runs" are light.

A SINGLE MATCH WILL PROVIDE YOU WINTER COMFORT

If you will switch to Gas the Carefree fuel for home heating . . . . .

Whether you heat your home with steam, hot water or warm air, your present furnace can easily be converted into a completely automatic GAS heating system. All that is needed is to install a GAS conversion burner and when the change has been made you will marvel that your home heating can be so carefree.

Our special offer enables you to know and enjoy this clean, silent method of carefree home heating without an immediate outlay of money . . . It costs nothing and obligates you in no way to get the facts about our SPECIAL OFFER —Do this today.

9 Reasons

—why you should use GAS, the carefree fuel: Fully automatic, convenient, healthful, modern, clean, simple to operate, dependable, quiet —it's cost is reasonable.

Heat YOUR HOME with Gas

Phone

—our house heating department or use the coupon for full details regarding our— SPECIAL OFFER

Get This Information Without Obligation

I would like to know all about your special offer.
Name .....
Address .....
RPF 43

● ILLINOIS POWER AND LIGHT CORPORATION ●

RPF 43

Hot Water Primer **By Tiny**

Baby is expressing individuality. Individuality is when a baby protests at being doused in a tub of cold water. (Even as you and I.) For cheerful and economical bathing for the whole family rent an Automatic Gas Waterheater from the Gas Company for $1.25 per month . . , dial 3-3121.

ADVERTISEMENT

Use a Baby to Beckon for Attention

We think the Central Hudson Gas and Electric Corporation, Poughkeepsie, N. Y., has hit upon a happy idea.

As a means of beckoning for the attention of the housewife, the user of hot water, the Central Hudson folks use the picture of a baby.

A chubby baby set in a generous

a consistent campaign to sell what have you is carried out along this line that many, many cubic feet will be added to the present domestic load.

The campaign, however, as someone has pointed out, must be consistent—"to accomplish anything worth while advertising must be, not spasmodic, not a flash in the pan, not a huge attempt today with none tomorrow nor next day; but a steady,

NOTICE

To make your gas water heating service of greater value to you we have available for those of our customers who wish them, an Upstairs Gas Water Heater Control for only the cost of installation and distribution—$4.55 completely installed, payable 55c down—55c per month with your gas bill.

***What it Does*—The Upstairs Gas Water Heater Control *lights and turns off* your basement Gas Water Heater *from upstairs.* Saves stair climbing. Saves time. Saves bother. It makes your hot water service more convenient.**

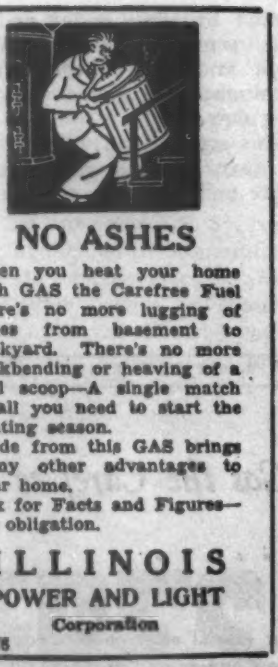
***Limited Quantity*—We have only a limited quantity of these controls. When they are gone there will be no more available at this price. First come, first served. Phone for yours now.**

NORTHERN STATES POWER COMPANY

Here's Another Thought

We have always thought that the "lowly tank heater" was a very much neglected source of revenue for the average gas man. We have always held that here was a couple of dollars per meter for the fellas who consistently pushed the sale of this unit. You know we are happy when we stumble on to something which promotes the additional sale, and use of this baby through the use of the jigger being exploited, we mean promoted, by such organizations as The Philadelphia Gas Works Co., The Wisconsin Power & Light and the Northern States Power.

Even if the Palm Beach Suit is very much the vogue right at this time, our thoughts just naturally turn to home-heating for next winter. It's our idea that the boys might do well to get busy on plans to advertise and promote the sale of boilers, furnaces and conversion burners right now. The more homes we heat with gas, the harder it's going to be for some of the other boys to install water heaters and ranges in homes where other than gas is used for fuel. Think it over!


NO ASHES
When you heat your home with GAS the Carefree Fuel there's no more lugging of ashes from basement to backyard. There's no more backbending or heaving of a coal scoop—A single match is all you need to start the heating season.
Aside from this GAS brings many other advantages to your home.
Ask for Facts and Figures—No obligation.
ILLINOIS
POWER AND LIGHT
Corporation
HH6

Consistency in Campaigning

To our way of thinking, one of the most consistent campaigns to sell gas house heating that has come to our attention, in recent months, is that being carried on by the Illinois Power and Light Corporation at Champaign-Urbana, Illinois.

The drive is made about twice each week with a 4-column by twelve inch advertisement and the daily follow through is attained by the use of a 1 column by four inch advertisement of the cartoon type with a carry-on of the objectionable features the man or woman of the house has to contend with. It's a mighty effective way to drive home the story as we see it and reports have it that T. C. Kellogg, Divisional Sales Manager is of the opinion that the advertising man is doing a good job—because it is producing inquiries that result in sales. After all, that's the answer to all advertising, isn't it?

An Electric Gas Generator

(Continued from page 31)

An apparatus in which all of the above named objects may be attained and which has been proven very useful for its purpose has been developed by a Norwegian firm, about five years ago. It produces water gas from anthracite and steam. A short account of this generator might be of interest. Its performance has been rather remarkable, as electric gas generators go.

It consists principally of a vertically placed cylinder lined with firebrick and filled with carbonaceous material, which is charged at the upper end. Steam is introduced at the lower end and the gas taken out at the top. The electric energy is introduced near the bottom and at the top, through carbon electrodes. (Söderberg). Single phase current is used.

The first generator was put into operation in the spring of 1930. It uses 250 kw and produces about 6000 cu. ft. per hour. In 1933 another generator was added. This has a continuous load of 400 kw and produces 10,000 cu. ft. per hour.

Both generators produce water gas of the following approximate composition (dry gas):

CO_2	1	% (vol.)
CO	48	%
H_2	51	%
SO_2	0.1	%
N_2	0.1	%

This gas has a calorific value of 310 BTU per cu. ft. Its moisture content is between 5 and 10%, and its outgoing temperature is kept at about 1000° F. This temperature may be regulated by raising or lowering the top electrode. The gas contains very little dust and is easily cleaned if required.

The energy input is mainly regulated by varying the voltage under load. The load curve is practically a straight line and very little regulation is necessary. The electrode consumption is remarkably small, being about 0.075 lbs. per 1000 cu. ft. of gas.

The carbon material used in these generators is anthracite in lumps not exceeding 4 inches, with an ash content of about 3%. Per 1000 cu. ft. of dry gas is used 18 lbs. of anthracite, exclusive of a small loss in the ash. Any low-ash coke of sufficient mechanical strength, also charcoal, is equally usable. Ordinary coke has not had much success in the present design, owing to formation of crusts on the wall in the lower part of the generator. There can be no doubt, however, that ordinary coke may also be used, with proper design.

The amount of steam required per 1000 cu. ft. of moist gas is 26 to 28 lbs. Water has been used instead of steam, but the latter is preferable, permitting of a more even and easily controlled distribution.

The operation of the generator is very simple and it requires a minimum of attention. The carbon material is charged every 2 hours and the ash removed every 8 hours, without disturbing the operation of the generator. The gas is controlled as to its content of moisture and CO_2 and the steam input as well as the electrical load varied accordingly, the gas demand being of course also taken into account in these respects. The gas is of an excellent quality and very uniform in composition.

When properly attended the generator will run for years without appreciable repairs. At intervals, which may have a duration of 5 months, the generator has to be emptied and cleaned. Changes in the design, purporting to lengthen these intervals are feasible and are contemplated at the plant in question. The proper regulation and distribution of the steam is very important for a successful operation, also that the ash is thoroughly removed.

The exploitation of the generator has been undertaken by the Norwegian firm Elektrokemisk Industri, address: Kongens gate 18, Oslo, Norway.

Advertising in Connection With Rate Reductions

William H. Hodge*

Vice President and Manager, Sales and Advertising Department
Byllesby Engineering and Management Corporation

FRANKLY, the main object of this talk is to provoke discussion which may help us do a little better job upon a subject which I think is extremely important.

Rate reductions by utilities during the depression total many millions of dollars.

It is doubtful if the public realizes what these companies have accomplished in this respect during a period when lower gross earnings, increased costs and higher taxes affected all of them severely.

If this lack of public consciousness exists, and I feel that it does, at least part of the responsibility rests upon the advertising men and women of the industry.

Management necessarily looks to its advertising departments to perform the function of expression; as possessors of skill and knowledge to interpret policies and programs so that the public will understand.

Numbers of large rate reductions have been made during the past few years with little more than formal newspaper advertisements and notices enclosed with bills. In some instances this represented the deliberate policy of the management and the advertising departments were unable to do otherwise than comply. Nevertheless, I question whether in all cases advertising executives exerted themselves to convince the management that this policy was wrong.

On the other hand, certain rate reductions have been handled with a large amount of advertising. Examples are the "objective rate" programs of the three Southern companies of the Commonwealth and Southern Corporation. Such is generally true of all companies which have instituted similar rate reduction plans or have offered so called free electricity to their customers, or the so called "bargain rates" of one kind or another.

It is, of course, impossible to put into effect new types of rate reductions such as those referred to without considerable advertising and publicity, as their acceptance and success depend upon public knowledge. These advertising programs, so far as my observation goes, have been skillfully handled but only so, in my judgment, up to a certain point, concerning which I will endeavor to make my meaning clear a little later on.

Practically all rate reductions which have been accompanied by anything approaching a considerable volume of advertising have been treated from two angles only, one to impress upon the public that lower rates have been made available, and second, to promote increased use of the service through the sale of appliances necessary to bring about such increased use.

Various terms long abhorred by the advertising profession, such as "free," "one-half price electricity," "one-half off," "cheap," "no extra cost plan," have been employed in great profusion. Only time will tell whether such slogans accomplished more good than harm. There is no question but that the mere institution of objective rates, accompanied by the greatly increased purchase of major household appliances by customers, and increased usage of service, have been quite successful. It is also true that the extensive advertising employed has had a great deal to do with these results.

Such companies which did not attempt the new style, or objective rate, method of reduction have endeavored to inject something a little different into rate reduction follow-up advertising, by the use of humorous copy. This has been quite well done by the Northern States Power Company and a number of other organizations, and some of it is now in progress. Notable in this style is the "Reddy Kilowatt" invention of Mr. Ash Collins.

The employment of humor in illustrations and copy has had quite a noticeable recent trend in appliance and sales promotional efforts, representing, of course, an attempt to get in touch with prevailing fashions as well as to remove the "heavy" or "high hat" atmosphere supposed to surround utility companies. The Spring campaign of the Electric Refrigeration Bureau of Pittsburg dramatized the plight of the germs with a high touch of comedy. The Philadelphia Electric Company made "Reddy Kilowatt" a real hero-comedian in a recent talking picture.

I have no adverse criticism to offer on the advertising which I have briefly alluded to. Most of it is clever and admirable. My thought is that rate reductions offer opportunity for far broader and perhaps even more valuable employment of advertising media, in addition to the publicity treatment in vogue.

It is, of course, an axiom that advertising should strive to be original or at least different from other advertising. To express it crudely, if most advertising were done with red ink the use of black ink or green ink would probably have a great amount of attention getting value. If the bulk of current general advertising is filled with smartness, sex and sophistry, possibly copy along serious lines would be acceptable and even interesting to the reader or hearer.

Is it not possible that when rate reductions are made a utility has a golden chance really to tell the public something about the principles upon which the rate schedules are made; about conditions which govern the price of its services, and the more important fundamentals of the business itself? Have we not overstressed the theory that the great majority of the public either will not pay attention to such matters or has no time to think about them? Has there not been, and is there not still, a strategy available to overcome the slanders of our adversaries by the employment of institutional facts?

Let us not forget that, after all, facts have had a long and impressive history in human affairs. People at various times have believed in them. Facts have dissolved fantasies and often prevailed in the final court of popular opinion.

It seems to me that when a rate reduction is made, that is the particular time when management should present its facts to the public—should comprehensively mobilize its facts and call in the people for a general review with colors flying.

** A talk before the Public Utilities Advertising Association, at the annual meeting, Chicago, June 11, 1935.*

It doesn't look good to me to see a company cut a million or two off its charges with a mere advertising wave of the hand. That seems like a gesture almost admitting the accusations of the adversaries. It looks as though a big rate reduction is the easiest thing in the world for a utility to make if it just wants to.

But if a company comes along and offers me lower prices or helps me to use what it sells more liberally, I am inclined to think that I would feel like looking over at least a few of its dull facts, and studying them, along with my rate reduction. Certainly I don't know when, if ever, I would be in a more receptive mood to do so.

Rates and rate making are complicated; there is no question about that. The principles that govern them, however, are simple. But an advertising man must first study and actually understand the theories and principles of rate making before he can attempt to tell the story simply and convincingly to the public.

Things in the rate picture which it seems to me could be explained to the public to our advantage include the very simple truth that unless the rates produce sufficient revenue so that the company can pay wages, salaries, material and supply bills, taxes and a fair return upon the investment several things will happen. First, the service itself will deteriorate and become more costly to the user; second, the company will go out of business and be succeeded by some instrumentality which will have to charge rates high enough to stay in business It seems odd that such a simple truth needs emphasizing to the public, but it is precisely such simple truths as this that are being lost sight of.

In the rate making scheme is an old fashioned, but still valid, idea that customers should be served without discrimination; that there should be no favored classes or individuals; that when certain definite principles are ignored favoritism and inequalities are bound to follow. The favored customer today may be the one who is penalized tomorrow.

It took many years of thought and effort on the part of able regulatory bodies, with the cooperation of the utilities, to establish and energize these principles. Unless rates are non-discriminatory, there is bound to be reversion to the old catch-as-catch-can and devil-take-the-hindmost situation and its obnoxious practices.

Another point regarding rates is the fact that unless each customer pays approximately the cost of serving him, some other customer or customers must bear the expense. To serve about half of the total customers of an average community it is necessary to rationalize this principle in order to serve them at all. In other words, the carrying of a large number of non-profit customers at something below cost, is possible only by getting other customers to use considerable volumes of service at a unit price somewhat above cost; in other words, through the most careful kind of an equalization process. We understand all this, but the public does not.

The facts regarding how the peak load on a system determines the size of the investment, and how the loads factor on a system affects the price per unit of service, are fundamentals which to us are as common as dirt, but of which the average citizen knows nothing whatever. Perhaps he did twenty or twenty-five years ago when a great many utility companies went to the trouble and expense of trying to tell him, by means of advertising, in the simplest possible terms something about these fundamentals. Today we have to deal with a public which has either forgotten or never heard of such things.

Mr. Lenard Nelson of the Oklahoma Gas and Electric Company recently has made some effort to develop newspaper advertising in line with what I have in mind, and I think he has made a good start. He has made an effort to explain why promotional electric rates benefit all homes, why mass production means lower rates for every home, and how certain kinds of domestic rates which were advantageous to the customers some years ago have been superseded by other types of rates which are more advantageous and of the greatest good to the largest number.

Today, except for household lighting and minor uses, electricity has been taken out of the "necessary monopoly" class. In the commercial and industrial lighting, heating and power fields, direct competition already is intense. With respect to household employment, it would hardly seem necessary to point out the present day directly competitive situation of refrigeration, cooking and water heating, but in many parts of the country these are comparatively new innovations. In order to work toward lower levels of domestic unit prices, the utilities must increase volume of service in the residential field, and to do this to an effective degree they necessarily have to increase the use of refrigeration, cooking and water heating by means of the services which they offer

These things, only briefly and imperfectly touched upon, have entirely changed the character of both gas and electric operations and placed them upon a basis where they have to fight for business fully as much as a department store or restaurant. Some may doubt the wisdom of explaining all this to the public by the means of advertising, but the fact remains that this is actually the condition, and my view is that the sooner we capitalize it for our own protection, the better. It is one of the important points which we should tell the public ourselves, and utilize it to build up a far different attitude towards us than has existed during the past few years.

The mention of competition inevitably brings to mind the deadly and destructive force of competition by the government. I have purposely refrained from any reference to political pressure in this talk, because I wished to confine it to suggesting one line of action which can have a great effect in removing that pressure. Government competition is not competition at all; it is the guillotine.

Almost equally destructive would be cut-throat competition between the various forms of light, heat and power. At our elbow is the farm electrification problem and its economic pitfalls. To all of these evils there is only one defense; one protective influence for sanity and stability, and that is a widespread knowledge of the facts. There is only one practicable method of attaining this objective and that is through advertising.

I believe that all over the country today large numbers of people are tired of generalities and disgusted with alleged schemes for the public benefit which have gotten nowhere; that they are thinking, and thinking hard, and that they will appreciate serious discussions of utility fundamentals. Also, I believe that it is up to our advertising people to take the initiative, plan accordingly, and convince their managements that such is the right course to follow. No advertising brains in the country are too big for this job.

NEWS *of the* GAS INDUSTRY

George B. Cortelyou Retires As President Consolidated Gas Co. of New York

The Board of Trustees of the Consolidated Gas Company of New York at its meeting June 4th approved the report of a special committee of the Board recommending the adoption of a retirement plan and retirement compensation for employees and officers of the Consolidated Gas Company and its affiliated gas, electric, and steam companies.

The plan provides for retirement at the age of 70 years, and will become effective July 1, 1935. It is a development of studies that have been made for many months under the direction of the President.

The company has had in effect for many years a superannuation plan applicable to employees and officers who have completed 25 years of continuous service. The new plan follows the general principles of that heretofore in effect, except for the requirement of compulsory retirement, and it will become effective in all of the companies affiliated with the Consolidated Gas Company.

Mr. George B. Cortelyou, President since 1909, being over the stipulated age, will retire July 1, 1935.

Other officers of the affiliated companies who will retire under the plan are:

H. L. Snyder, President, The New York & Queens Electric Light and Power Company.

W. G. Hoyt, President, The Standard Gas Light Company of the City of New York.

E. S. Bellows, Treasurer, Westchester Lighting Company, and The Yonkers Electric Light and Power Company.

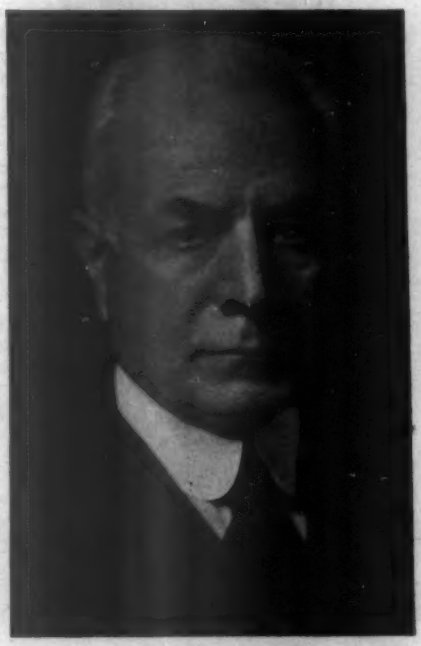
C. A. Barton, Vice President, The New York and Queens Electric Light and Power Company.

Of the combined personnel of the group of companies affiliated with the Consolidated Gas Company, approximately 200 will be affected by the retirement provision of the plan.

Mr. Frank W. Smith, President of The New York Edison Company and The United Electric Light and Power Company, was elected President of the Consolidated Gas Company, to take office July 1. Mr. O. H. Fogg, a Vice President of the Consolidated Gas Company of New York and The New York Edison Company, was elected Executive Vice President.

George B. Cortelyou

George Bruce Cortelyou is the fourth President of the Consolidated Gas Company of New York. He joined the Company in March 1909 as President and Trustee, just after he had retired as Secretary of the Treasury in President



George B. Cortelyou

Theodore Roosevelt's cabinet.

During the twenty-six years he has served as President, the Consolidated Gas Company has grown from an organization of 11,000 employees to more than 45,000. The assets of the Company have increased from $332,324,856.95 in 1909 to more than $1,300,000,000 in 1934.

It has often been said that Mr. Cortelyou has always had the loyal affection of all employees in the Consolidated system. Early this year he was welcomed into the Company's Quarter Century Club, whose membership is limited to those men and women who have completed twenty-five years of continuous service with the Company.

Mr. Cortelyou was born in New York City on July 26, 1862. His ancestors were distinguished in Colonial and Revolutionary history in the State of New York.

After passing through the public schools, he attended Nazareth Hall Military Academy, at Nazareth, Pa. He graduated from the Hempstead, Long Island, Institute in 1879, and from the State Normal School, Westfield, Mass., in 1882.

He entered the New England Conservatory of Music at Boston, and also studied under Dr. Louis Maas, former conductor of the Philharmonic Society of Boston. He continued his study of music in New York during 1884 and 1885 and also attended Walworth's Stenographic Institute. As a result of his stenographic training he entered government service in 1884 in the office of the Appraiser of the Port of New York. He was later a general law reporter, and the principal of a private school.

He became associated with the post office department, which later he was to head, in 1889 when he took a job as private secretary to the post office inspector in charge at New York City. He was later a confidential stenographer to the surveyor of the Port of New York.

Then followed a long and eventful career in Washington. He served in three cabinet positions, and he was also the personal friend and associate of three United States Presidents.

His Washington career started in 1891, when he became private secretary to the Fourth Assistant Postmaster General. In November, 1895, he was transferred to the Executive Mansion as stenographer to President Cleveland, and three months later he was made executive clerk to the President.

In 1898 Mr. Cortelyou became an assistant secretary to President McKinley, and in 1900 he was appointed Secretary to the President.

Mr. Cortelyou continued as Secretary to the President under Theodore Roosevelt until 1903, when he entered the cabinet as the first Secretary of the newly created Department of Commerce and Labor. He organized the department and mapped out the lines along which it has since developed.

He resigned in June, 1904, to become Chairman of the National Republican Committee, in which capacity he conducted the campaign which resulted in the election of President Roosevelt.

Frank W. Smith

Frank Whitney Smith, President of The New York Edison Company and The United Electric Light and Power Company, who will become President of Consolidated Gas Company, is one of the distinguished veterans of the electric light and power industry. He has been active in the industry for more than 55 years—since the first week in January, 1880,

Frank W. Smith

nearly three years before Thomas A. Edison opened in New York City the Pearl Street generating station. It was this station that began the central station electric service that the world knows to-day. Mr. Smith's electric career antedates that of the present industry because, as a boy, he took a job with one of the earliest arc lighting organizations, the United States Illuminating Company, which subsequently became part of the present United Electric Light and Power Company.

Born in Alden, Erie County, New York, June 22, 1867, Mr. Smith comes of Revolutionary War stock. His great-great-grandfather was Col. Samuel Drake, who served through the Revolutionary War in the Third New York Westchester Regiment. His first ancestor in this country was Lieut. Joseph Drake who died in 1731 and was buried in St. Paul's Churchyard in Eastchester, Westchester County. These Drakes were descendants of Sir Francis Drake, the English navigator and explorer.

In January, 1880, at the age of thirteen, he made his debut into the business world as an office boy in the employ of the United States Illuminating Company. Three years later young Smith was made a general clerk. He held this job until 1889, when his company was merged into the newly formed United Electric Light and Power Company. He was appointed paymaster of the new company, and held this post until 1891, when, at the mature age of twenty-four, he became assistant auditor. Eight years later, in 1899, he was made assistant secretary of the United, and secretary of the Brush Electric Illuminating Company, another of the early arc light concerns. He became secretary of the United in 1905, and seven years later, in 1912, he was elected vice-president, and in 1916 vice-president and general manager. He became a vice-president of The New York Edison Company in 1931, and in January, 1932, he was elected president of both companies.

Oscar H. Fogg

Oscar H. Fogg, who becomes Executive Vice-President of the Consolidated Gas Company of New York, has been a vice-president of the company since 1924, and a vice-presidnet of The New York Edison Company since 1932. He is also a member of their governing Boards.

Col. Fogg entered the gas industry with the United Gas Improvement Company in Philadelphia, where he was born. Later he became cadet engineer of the U.G.I. plant at Yonkers, N. Y. In 1901 Col. Fogg was made superintendent of the Newtown and Flushing Gas Company, at Flushing, Long Island. Then he was placed in charge of construction of a new gas works system at Ocean City, N. J., and after completion of the plant was in charge of operation.

He came to the Consolidated Gas Company in 1904, in the department of mains and services, where he remained until 1910, when he was assigned to special research problems, including an investigation of gas-making processes, the utilization of by-products of gas manufacture, and allied subjects. During this time Col. Fogg also made a comprehensive study of the gas utilization methods then practiced in the United States and Europe.

Miss Swann Resigns to Take New Post

Miss Ada Bessie Swann, director of the Home Economics Department of the Public Service Electric and Gas Company, Newark, N. J., recently resigned to become a member of the editorial staff of the Crowell Publishing Company and director of the new food and equipment department of the Woman's Home Companion, a magazine published by the Crowell Company.

Miss Swann has been in charge of home economics work for Public Service for fifteen years and has directed the activities of the Home Economics Department from the General Office in Newark. In July 1919, Miss Swann was transferred to the General Office from the Plainfield Commercial Office where she had been employed as home economics consultant for Central Division for 2½ years. Miss Swann then began the organization of the Home Economics Department to cover all divisions of the company territory. For several years the home economics work was carried on by Miss Swann alone but the department has grown to such an extent that there are now fourteen home economics consultants in the department.

Palmer House to Be Headquarters of A. G. A. Convention

The Palmer House, Chicago, has been selected as headquarters for the 17th Annual Convention of the American Gas Association to be held the week of October 14. Accommodations sufficient to take care of a large and representative gathering of gas industry men and women have been reserved.

Facilities of the Palmer House are ample to provide for general business sessions and entertainment features of the convention as well as a number if not all of the sectional meetings. The Palmer House is centrally located in Chicago's famous loop district.

Reservations should be made by writing direct to the hotel.

Wacker Appointed Assistant General Sales Manager of C. J. Tagliabue Mfg. Co.

The C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., manufacturers of Temperature, Pressure, Flow, Humidity, Time and Level Instruments, announces the appointment of Mr. E. D. Wacker, as Assistant General Sales Manager.

Mr. Wacker has been with the company for 11 years, part of the time as Manager of the Pittsburgh territory and more recently as Division Sales Manager in charge of Snapon Controller Sales for Domestic Refrigerators.

The company also announces that the sales of the Snapon Controller Division will be in charge of Mr. R. A. Skinner.

Canadian Gas Assn. Meeting

The Canadian Gas Association held the Twenty-Eighth Annual Convention June 10th and 11th at Quebec, Canada. The meeting was well attended and included gas men from as far west as Vancouver, B.C. and from Halifax, Nova Scotia. The papers read at the meeting covered a variety of timely subjects. Two of the papers presented are included in this issue of the JOURNAL.

John Keillor

The following officers of the Association were elected for the coming year:

President: John Keillor, Gas Engineer, B. C. Electric Railway Company, Ltd., Vancouver, B. C.

1st Vice-Pres.: W. H. Munro, General Manager, Ottawa Gas Company, Ottawa, Ont.

2nd Vice-Pres.: Edward J. Tucker, Ass't General Manager and Secretary, Consumers' Gas Company of Toronto

Sec'y.-Treas.: George W. Allen, Gas Survey Engineer, Toronto, Ont.

Canadian Representatives to the Managing Committees of the Various Sections

of the American Gas Association are:
Accounting: E. J. Tucker, Toronto
Technical: J. D. Van Maur, Toronto
Manufacturers': A. MacKenzie, Toronto
Commercial: O. L. Maddux, Hamilton
Industrial: H. E. G. Watson, Toronto
Gas Standards & Service: Arthur Hewitt, Toronto

Buffalo Office for Pittsburgh Equitable

The Pittsburgh Equitable Meter Company and its subsidiary, the Merco Nordstrom Valve Company, announce that they have opened a District Office in Buffalo, N. Y. to better serve the

C. F. Thomas

trade in the territory of western and central New York State.

The new office is located in the Iroquois Building at 37 Church Street and is in charge of District Manager C. F. Thomas who has represented these companies in New York for a number of years. He will be assisted by Mr. D. A. Gardner.

R. I. Smith Made Factory Representative

The appointment of Robert I. Smith as Factory Representative of the Premier Water Heating and Gas Boiler Division, La Porte, Ind., to the Philadelphia and Baltimore Branches of the Crane Company, has been announced by Stanley Jenks, Eastern Division Manager.

Mr. Smith, after graduating as an electrical engineer, Syracuse University in 1921, and completing a special course on Public Utility Management at Harvard, entered the public utility business as a cadet engineer with the Northern Indiana Gas and Electric Company in Hammond.

A native of Syracuse, Mr. Smith brings to the Crane organization a long experience in utility gas water heating and boiler sales problems. After an intensive training at the La Porte Plant in factory products, Mr. Smith started his duties at the Philadelphia Branch office of the Crane Company, June 1. The Philadelphia Branch located at 245 Master Street has an exhibit room at 1301 Locust Street, and sub-branch offices at Camden, N. J., Frankford, Pa., Reading, Pa. and Trenton, N. J.

Little Bugs and Gas Heat to Protect Citrus Fruit

The use of gas as fuel for incubating and brooding of poultry is not new and many other forms of gas heating are familiar. But from southern California comes word that a gasfired boiler supplies heat for hatching bugs. It seems that in California they take seriously that old rhyme: "Big bugs have little bugs upon their backs to bite 'em; the little bugs have lesser bugs, and so ad infinitum."

Anyway, citrus fruit suffers from the mealy bug and the mealy bug has another bug that is a deadly enemy, reports the New Jersey Public Utility Information Committee. The exact name is Crypttollaemus, if you want to be technical. So a gas-fired furnace supplies heat for a bug-house that breeds 400,000 of the last-named bugs every day and sends them out to combat the mealy bugs. They are said to be very efficient.

New Liquid Chemical for Rustproofing Gas Holders and Storage Tanks

The American Chemical Paint Company, of Ambler, Pa., known for their developments in the field of rust prevention, are announcing a new water-like liquid chemical for rustproofing gas holders and storage tanks.

The chemical has been called ACP 33 Rustproofer and it is said to prevent the formation of rust under paint by combining with the metal to form an inert coating to which paint firmly adheres.

The Company claims that the chemical is easy to use, and that it is as effective on holders or tanks covered with tight rust or mill scale, as it is on holders or tanks that are perfectly clean.

Complete information on this new dedevolpment can be secured by addressing the Company at Ambler, Pa.

A. G. A. Nominating Committee Reports for 1935-1936

The general nominating committee of the American Gas Association will report the following nominations for new Association officers for 1935-1936 at the Association's 17th annual convention to be held at the Palmer House, Chicago, the week of October 14:

For President—L. B. Denning, president, Lone Star Gas Co., Dallas, Texas.

For Vice-President—Herman Russell, president, Rochester Gas & Electric Corp., Rochester, New York.

For Treasurer—J. F Rooney, assistant to vice-president, Consolidated Gas Company of New York, New York, N. Y.

For Directors—Two Year Terms: Walter C. Beckjord, vice-president and general manager, Columbia Gas & Electric Corp., Pittsburgh, Pa.; H. O. Caster, member executive committee, Henry L. Doherty & Co., New York, N. Y.; Charles M. Cohn, vice-president, Consolidated Gas, Electric Light & Power Co., Baltimore, Md.; H. C. Cooper, president and general manager, Hope Natural Gas Co., Pittsburgh, Pa.; J. S. DeHart, Jr. president, Isbell-Porter Co. Newark, N. J.; George S. Hawley, president, Bridgeport Gas Light Co., Bridgeport, Conn.; C. W. Hunter, vice-president, United Engineers and Constructors, Inc., Philadelphia, Pa.; Conrad N. Lauer, president, The Philadelphia Gas Works Co., Philadelphia, Pa.; B. J. Mullaney, vice-president, The Peoples Gas Light & Coke Co., Chicago, Ill.

Respectfully submitted,
Dana D. Barnum, Chairman
Frank L. Chase
C. E. Gallagher
H. L. Masser
P. R. Tappan
F. C. Weber
Nominating Committee

The following nominations have been made by the other Nominating Committees for the next Association year:

Natural Gas Department: For Chairman—William Moeller, Jr., vice-president, Southern California Gas Company, Los Angeles, Calif.; for Vice-Chairman—George E. Welker, president, United Natural Gas Co., Oil City, Pa.

Accounting Section: For Chairman—F. L. Griffith, vice-president, The Peoples Gas Light & Coke Co., Chicago, Ill.; for Vice-Chairman—E. J. Tucker, assistant general manager and secretary, Consumers Gas Co. of Toronto, Toronto, Ont., Canada.

Commercial Section: For Chairman—C. E. Bennett, president, Binghamton Gas Works, Binghamton, N. Y.; for Vice-Chairman—F. M. Banks, vice-president, Southern California Gas Co., Los Angeles, Calif.

Industrial Gas Section: For Chairman—C. W. Gale, new business manager, Knoxville Gas Co., Knoxville, Tenn.; for Vice-Chairman—Ralph L. Manier, industrial heating engineer, The Syracuse Lighting Co., Syracuse, N. Y.

Manufacturers Section: For Chairman—John A. Fry, president, Detroit-Michigan Stove Co., Detroit, Mich.; for Vice-Chairman, Apparatus Division—Merrill N. Davis, vice-president in charge of sales, S. R. Dresser Manufacturing Co. Bradford, Pa.; for Vice-Chairman, Appliance Division—J. Scott Fowler, president, Lovekin Water Heater Co., Philadelphia, Pa.

Publicity and Advertising Committee: For Chairman—Henry Obermeyer, assistant to vice-president, Consolidated

Convention Calendar

July

11-12 Pacific Coast Gas Association, Northwest Conference, Tacoma, Wash.

September

17-19 Pacific Coast Gas Association, Pasadena, Calif.

October

14-18 American Gas Association, 17th annual convention, Palmer House, Chicago, Ill. Alexander Forward, managing director.

Gas Company of New York.

Technical Section: For Chairman—F. A. Lydecker, general superintendent of gas distribution, Public Service Electric & Gas Co., Newark, N. J.; for Vice Chairman—Martin I. Mix, superintendent of distribution, The Peoples Gas Light & Coke Co., Chicago, Ill.

Harnischfeger Appoints Daniels as General Sales Manager

Announcement is made by the Harnischfeger Corporation of Milwaukee of the appointment of Mr. Charles W. Daniels as general sales manager for the entire line of P&H contractors'

equipment, industrial products, P&H-Hansen Arc Welders, hoists, brewery equipment, etc.

Mr. Daniels, who has been connected with Harnischfeger for many years in various capacities, was for several years in New York, but most recently in charge of the Corporation's Philadelphia office. He has already transferred to the home office in Milwaukee to assume active charge of the sales for the various manufacturing divisions. He is succeeded in Philadelphia by Mr. L. M. Stout, who has been appointed to fill the vacancy as District Manager for that territory.

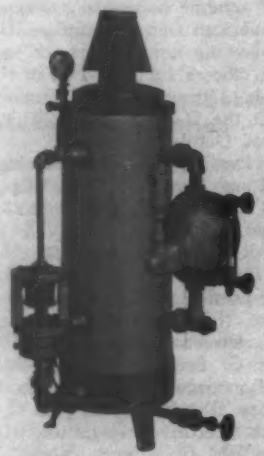
New Type Thermostat

The Mercoid Corp., Chicago, Ill., have issued a leaflet describing their new Mercoid Sensatherm, a new development in thermostat control. The manufacturer states that the Mercoid Sensatherm, being of small mass and requiring but very little power to open and close the circuit, is so sensitive and follows room temperature changes so quickly, that uniform temperature control is positively assured. It employs a hermetically sealed mercury contact switch, thereby eliminating the problem of corrosion, dust, pitting, and arcing encountered where contacts are made and broken in the open atmosphere. The foreign matter accumulated on the surfaces of open contacts usually is of a non-conductive nature, making it necessary to exert additional contact pressure in order to close the circuit. Descriptive matter will be mailed on request to Mercoid Corp.

Commercial Cooking Heat Control

The Robertshaw Thermostat Co., Youngwood, Pa., have issued a Bulletin describing a Robertshaw heat control for every commercial need. They have a thermostat for baking ovens, coffee urns, deep fat fryers, dish washers, hotel ranges, steam tables and toasters. Each is designed to meet certain requirements as applied to each appliance. Reproductions of all the types of thermostats are shown and described and various sizes of each are given. A copy of Bulletin will be mailed on request.

Pressing Machine and Steam Iron—
BOILERS



P. M. LATTNER MFG. COMPANY
CEDAR RAPIDS, IOWA

Prize Winners in Home Service Skit Contest

A skit contest was this year promoted as one of the activities of the A.G.A. Home Service Committee. Skits have been found an excellent method of promoting interest in gas and gas appliances among both customer and employee groups.

To overcome the handicap in the scarcity of suitable skits, a contest with cash awards was carried through the Spring months, closing on May 1st. Thirty-nine skits were submitted representing every section of the country and Ruth Soule, of the Brooklyn Union Gas Company, as Chairman of the Sub-Committee announces the following prize winners and those receiving honorable mention.

First—Miss Claribel J. Adams, Washtenaw Gas Company, Ann Arbor, Mich., $15.00; Mr. W. D. Thurber, Southern Counties Gas Company, 810 S. Flower St., Los Angeles, Calif., $10.00; Miss Madge Peifer, The Syracuse Lighting Co., Inc., Syracuse, N. Y., $10.00; Mr. E. D. Smith, The Dayton Power & Light Company, Dayton, Ohio, $5.00; Mr. H. D. Berry, Northwestern Utilities Ltd., 10124-104th St., Edmonton, Alberta, Canada, $5.00; Miss Myrtie Lloyd, The Dayton Power & Light Co., Dayton, Ohio, $5.00.

Honorable Mention

Mrs. Florence M. Wren, Public Service Electric & Gas Company, Hackensack, N. J.; Mr. R. H. Lowe, Malden & Melrose Gas Light Co., 157 Pleasant St., Malden, Mass.; Miss Helen M. Kuehn, Northern States Power Co., Stillwater, Minn.; Miss Gladys M. Cross, Beverly Gas & Electric Co., Beverly, Mass.; Mr. Thomas Bradshaw, Spokane Gas & Fuel Company, Spokane, Wash.

A Master Check-Up

"The Load Builder," June issue, published by Roberts-Gordon Appliance Corp., Buffalo, N. Y., contains "A Master Check-up on the Selling Program," which is a suggestion for an organized plan set up as a guide for a campaign on house heating. The suggestions cover territories, organization, sales quotas, sales reports, sales training, sales meetings, the selling story, sales tools, canvassing, stimulating contests, prices and terms, sales plan and budget and dealer co-operation. A copy of "The Load Builder" will be mailed on request.

Changes in Personnel

George Kollock, industrial engineer for the Georgia Natural Gas Corporation, has resigned to accept a position with the F. J. Evans Engineering Company, of Birmingham, Ala. Raymond C. Broach has been appointed industrial engineer of the company to take his place, and Frank Lassiter, engineer in the house heating department of the Atlanta Gas Light Company, has been named head of that department to take the place vacated by Mr. Broach.

Large Bridge Line Completed in Cleveland

Several unusual features distinguish the new gas line recently laid across the new Lorain-Central bridge in Cleveland, Ohio, to carry natural gas from the east side to the west side of that city.

This line, said to be one of the longest and largest of its kind, was laid on a third level of this bridge, especially designed for such water and gas pipe lines. With the approaches, this bridge is just one mile long. The length of the line on the bridge is approximately 3,100 feet. The line was constructed on rollers with top roller guides. The welded joints were each covered with a Dresser Coupling.

Two hundred and thirty-one (231) couplings of this type were used, the size being 20" O. D., corresponding to the diameter of the pipe. The middle ring of each Coupling was equipped with a ¼" tap and a stainless steel plug which can be removed and a test made for gas leakage in the weld underneath.

Zink Invents New Type of Luminous Flame Burner

John Zink, Tulsa, Okla., manufacturer of a new type of luminous flame conversion burner, is a chemical engineering

John Zink

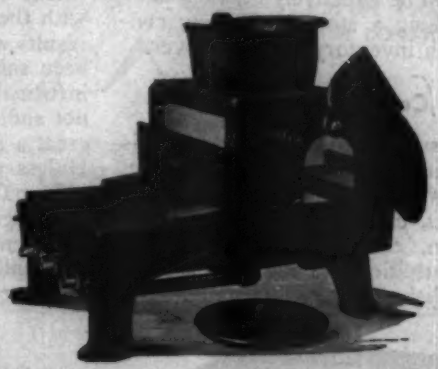
graduate of the University of Oklahoma, class of '17. He was associated for a number of years with the Oklahoma Natural Gas Corporation prior to his invention of the John Zink Burner and the establishment of his manufacturing business in 1928.

G. H. Priest Retires as Manager Brockton Gas Light Co.

George H. Priest, for 19 years manager of the Brockton Gas Light Co., has retired to become vice-president of the firm, this being an advisory office. Mr. Priest has been associated with the gas industry for 35 years, having been connected with several companies throughout the eastern part of the country.

A. D. Matarese, plant superintendent, is to take over Mr. Priest's duties at least for the present. He has been associated with the Brockton firm for seven years, having previously been connected with Fitchburg, Malden, and Salem companies.

JOHNSON BENCH FURNACE
Operates Without Blower



This is the famous Johnson No. 118 Combination Bench Furnace designed for heating soldering coppers, melting soft metals and heat-treating carbon steel tools and parts. It is an outstanding performer and provides quick, intense heat without a blower. Three powerful Johnson Burners do the job, each being equipped with pilot light and shut-off valve. Write for free catalog.

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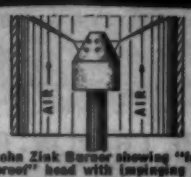
The Gas industry has been waiting for a Burner like this! Cast-iron built—lasts a lifetime—burns either natural or artificial gas—equipped with Baltimore Automatic Cut-off and a John Zink limiting orifice! You can sell at cost, at a small profit, or install it as you do your meters—and BUILD LOAD!

This John Zink Burner will open the great low-income home market to Gas Heat. Let us send you a test Burner—no obligation!



John Zink Burner showing "foolproof" head with impinging jets

JOHN ZINK BURNERS • TULSA, OKLAHOMA

Importance of Record Control

(*Continued from page 19*)

Inventories of material, supplies, and re-sale merchandise have always represented one of the most variable and difficult factors to control in the operation of a public utility organization. The investment has been too large, the turn-over too low, and the factor of obsolescence and damaged material has in many instances reached rather alarming proportions. Insurance, handling charges, and storage space requirements have become unnecessarily large. These conditions are directly attributable to a lack of proper facilities for executive management control by classifications. The only manner in which this operation can be effectively handled is by establishing a stores budget to control both inventory and turn-over.

Budget Control

The subject of budget control is too extensive to discuss at this time, but it is very essential that revenue, expenses, capital expenditures, construction, cash, new business, and other activities be budgeted in order to establish a definite and sound basis of operation. Executive control of these activities is impossible unless some means are provided for comparing actual performance with the results that must be secured in order to insure a profitable operation of the entire enterprise. These conditions must be observed and analyzed monthly in order that necessary action can be taken to properly balance the actual with the anticipated or expected results.

The Importance of Proper Record Equipment

The system may be properly designed, the procedure correctly outlined, and the clerical personnel perfectly trained and supervised, but unless the same amount of care is used in the selection of the equipment which it to be used in connection with the operation of the system the results will not be satisfactory. It has been said that records must provide information when needed. This is not sufficient, because it involves too great a factor of the human element. Unless records reveal the necessary information and sound the necessary warnings concerning every condition that demands attention, they are not accomplishing what may reasonably be expected of them.

Bring your gas plant problems to Semet-Solvay for solutions that will be most economical, incorporate the soundest engineering principles and fit operating conditions in every respect. No obligation is involved in discussing your needs with our engineers.

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New York, N. Y.

FULTON
Cut-Out Latch
Regulator

If Gas Fails

the Regulator will close and lock

THERE are no hazards due to failure of gas supply where the Fulton Cut-Out Latch Regulator is installed. Let pressure drop below the set minimum and the latch automatically shuts and locks the valve. Before flow will resume, the operator must open the valve by hand. Users of low-pressure furnaces and burners protect their equipment effectively, at little cost, by adoption of this safeguard. Ask for Bulletin 2987.

Dependable C-F Regulators for all requirements of pressure control are used in widely varied branches of industry. Catalog on request.

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Chace Thermostatic Bimetal is the active element that automatically governs operation of safety pilot light valve on Sonner Burners. By this control the fuel supply to main burner is shut off in the event that pilot light is extinguished.

Chace Thermostatic Bimetal is now used in every line of industry where automatic control of temperature is called for, or where automatic action must take place with change in temperature.

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"It Bends with the Heat"

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Upper Sports Deck—where guests can take a sun bath in a bathing suit or enjoy deck sports.

CASINO ★ IN ★ THE ★ AIR... *New York's largest open air Restaurant*

Domestic Gas Utilization

(Continued from page 28)

presentation of data from a recognized experimental laboratory.

The relative effect of several leaking hot water faucets in a home, even at a slow rate of drip, can be appraised by comparing the preceding picture table with an assumed average of 1500 gal. per mo. Assuming this average home has one faucet losing 120 drops per min. and two others losing 60 drops per min., the total loss would be 813 gal. per mo., or over 54.2% of the water actually used, with its consequent serious bearing on gas consumption. To grasp what this additional cost of leaky fixtures is, assume as a rough figure momentarily that 2 cu. ft. of 525 gas are required to heat 1 gal. of hot water—in the case cited above the wastage would be 2 x 813 or 1,624 cu. ft. Tightening up on the threaded stuffing box nut around the faucet will compress the washer packing and often stop the water leak. Washers subjected to steam and to excessive temperatures, such as those of water delivered occasionally by furnace coils and range boilers, quickly reach the point of uselessness. Rapid deterioration is noticeable particularly in the kitchen because of the frequency with which the faucet is opened and closed, estimated by one authority to be 80% of the total number of times that water is drawn in the home. There is only one answer, namely, hot faucet washers must be replaced if necessary—do not "compromise with the devil."

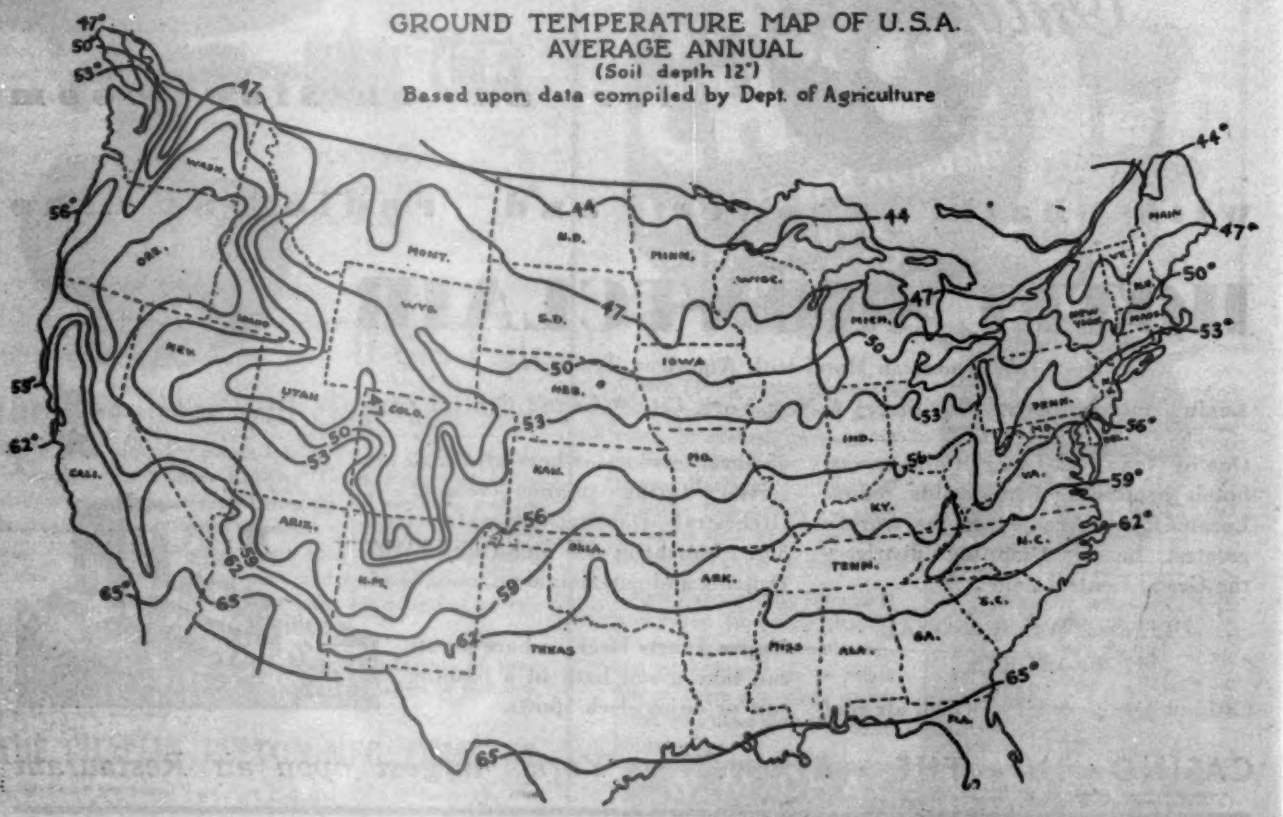
Occasionally the uninitiated salesman attempts to estimate probably hot water consumption by "pulling out of thin air" some arbitrary percentage of the monthly water company bill for total water usage. Watering lawns and shrubs, washing car, etc., etc. introduce unsurmountable complications to this treacherous and erroneous method. Skip it!

Numerous tests have been conducted at scattered points in this country to establish the average monthly use of hot water per customer and also per resident. The consensus of opinion is that the variation of the average is between 7 and 15 gal. per day per capita, or 210 to 450 gal. per month. A study of a multitude of cases indicates a minimum consumption of 4 gal. per day per capita to a maximum of as high as 25 gal. However, a useful "rule of thumb" is that the average residence will use an average of 10 gal. of hot water per day per capita, or 300 gal, per mo., to which must be added the hot water losses in leaking faucets and heat losses from the piping system. A metered test on 34 consumers deemed to be representative of a Pennsylvania town for a year's period establishes an average hot water consumption of 32.04 gal. assuming 4 gallons per capita. It is notable that water consumption is seldom strictly in direct proportion to the number of people in a home, the tendency being toward decreased water use per capita in homes with a large number of people. All in all, the foregoing data and suggested methods of analysis of individual cases bearing on "Hot Water—How Much?" can with practice be of assistance in solving the problem. Results will not always be perfect but they'll be a lot better than a blind guess or non-committal evasion.

We have advanced to the point of conjecturing on the probable temperature at which cold water enters the home in any given community—a question of manifest importance. The accompanying map of the United States with constant temperature lines indicates the average annual ground temperature (hence water temperatures) prevailing in various localities.*

(Continued on page 56)

* *This map is the result of calculations on data presented in the Jan. 1931 issue of Monthly Weather Review published by the United States Dept. of Agriculture.*



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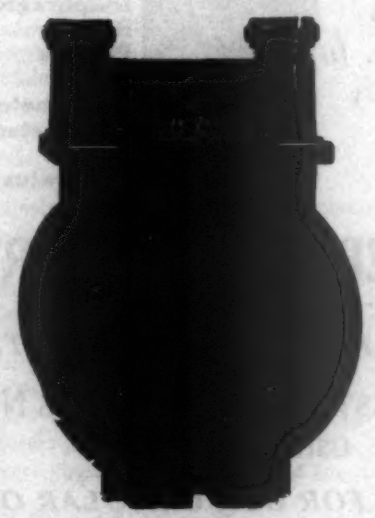
low, medium, and high pressures



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The Reliable Shut-Off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

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GAS SERVICE STOPS

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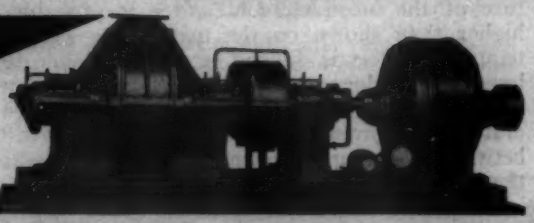
Roots CONNERSVILLE



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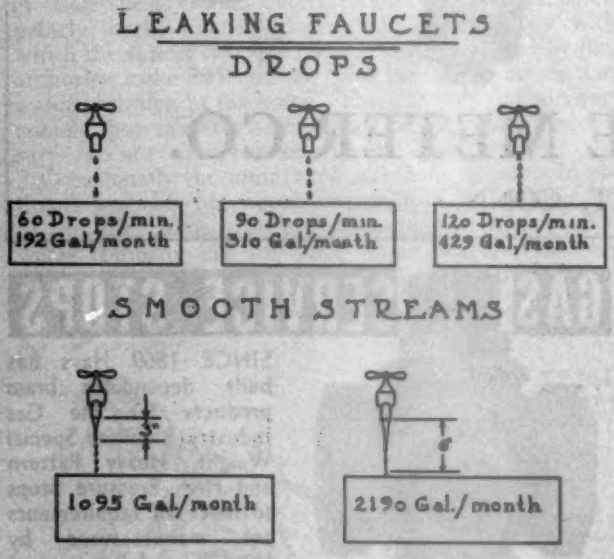
Roots-Connersville Blower Corp. CONNERSVILLE, INDIANA

Domestic Gas Utilization: Water Heating Division

(Continued from page 48)

Inspection of these temperature lines demonstrates that a direct relationship exists between ground water temperatures and the amount of cold water experienced (commonly referred to as the temperature deficiency or the degree day deficiency.) Inasmuch as local conditions (such as surface reservoirs, exposed tanks, velocity of water in mains, etc.) might effect these annual water temperatures a check on your own water conditions is advisable. The significant fact is apparent that, generally speaking, the water inlet temperature in New England approximates 44° and in the deep South around 62° F., or a differential of 18°. Therefore the temperature rise in a water heating system up to a delivery point of 135° in New England will be 18 ÷ (135—62) = 24.6% greater, or in other words will require roughly a 25% greater gas consumption to heat the same volume of water.



Because of the tempering effect upon the water between the point of cold water entrance to the house and that of the gas heater and/or cold faucets due to exposure of piping to the absorption of heat from the surrounding basement atmosphere, the effective temperature of the incoming cold water is probably slightly higher than shown on the map. The extent of this tempering effect is difficult if not impossible to predict but probably does not exceed 3° to 5° for the year. In the winter time, however, this heat absorption is considerably more pronounced due to the greater differential between incoming water and basement temperatures. In the more severe northern climates the use of a galvanized range boiler attached to the ceiling of a basement for tempering purposes is reported to have substantially decreased the required temperature rise with consequent economy in the gas bill.

Editor's Note—In Mr. Merriam's article in the June issue, the figures shown on the drawing in second column are the result of tests made by the Cleveland Heater Co., Cleveland, O.

All sizes up to 3,400 cu. ft. capacity

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LARGEST GAS COMPANIES NOW
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Oil Gas Plants — "Refractory Screen" Process for Base — Standby or Peak Loads — On Existing or New Water Gas Sets Low or High B. T. U. Gas

Gas Pressure Controls

(Continued from page 16)

shut off cock or turning in a wrong direction.

Welded Connections

Wherever possible welded connections are recommended in preference to any type of mechanical, flange or screw. Where it is necessary to attach smaller lines to large ones as on gauge lines, static lines and by-passes of smaller sizes both flange and screw joints at the connections to the larger lines require excessive space compared to welding. Any connections depending on gaskets and also screw joints depending on the joint compound for tightness are potential sources of gas and oil leaks, nominally cost more, are more difficult to change either during the initial construction or future alterations and are more limited as to the positions in which they may be installed. The elimination of oil seepage even when no gas leaks occur is advantageous as the gradual accumulation of this oil in masonry causes a constant disagreeable odor and contact with shoes or clothing leaves an odor difficult to eradicate. The oil accumulating may cause a slippery condition after the lighter oils have evaporated resulting in unsafe working or inspection conditions. The welding of all fittings even on the smaller ½" or ¾" lines will minimize the difficulties of locating minute leaks.

Ventilation

Providing proper ventilation for a pit is a difficult problem. The features on which ventilation depends for success are entirely local not only to a particular geographical area but to the many conditions affecting air currents at the immediate vicinity of the vent. For this reason no matter how carefully a natural draft vent may be designed and constructed, experience demonstrates that they are seldom continuously efficient. Many companies have installed forced draft ventilation systems either electrically operated or employing the differential pressure across the line regulator as the motivating force in a turbine. Electric motors naturally must be of a type which will protect against sparks igniting surrounding gas. The turbine type employing differential pressure requires a gas flow at all times in excess of the quantity required for power unless intermittent operation is satisfactory.

Safety features may be incorporated in the gas turbine which would result in the turbine being shut down when the quantity flowing through the line regulator dropped below a predetermined amount. Mechanical ventilators have not been generally adapted due not only to the mechanical difficulties experienced in maintaining uninterrupted service but also because an actual necessity for continuous ventilation is unusual. Leaks of a quantity which would result in explosive mixtures within governor pits or houses are of such infrequent occurrence where proper inspection and maintenance is periodic that continuous mechanical ventilation is an unnecessary expense. Should a utility find a continuously dangerous gas atmosphere within a regulator housing the cause of the leakage should be investigated and remedied rather than the installation of devices for keeping the polluted atmosphere beneath the danger zone. Where the moisture conditions are severe mechanical ventilation would have a distinct advantage in minimizing the accumulation of water on the interior surface of the housing but natural draft ventilation sufficient to keep the interior of the housing free of excessive moisture may be secured by study and trial at less initial cost and maintenance expense.

When line regulators are open for inspection or repair the accumulated gas escapes into the housing and on such occasions the most satisfactory provision is to have portable blowers with larger air-capacity than would be possible with permanently installed ventilators. The portable blowers are provided with canvas or flexible tubing by which the air can be led directly to the line regulator or opening resulting in a rapid mixture of the escaping gas with air which mixture though having a slight gas odor would not affect workmen. The outlet of the blower air line should be kept as close to the source of escaping gas as possible.

Even with permanently installed ventilators the portable blowers are advantageous in securing a non-harmful mixture before reaching workmen's nostrils as otherwise a more concentrated and possibly harmful mixture would pass workmen's faces when being drawn toward the permanent ventilator's inlet. This safety factor would be particularly valuable on non-odorized natural gas. On natural gas maintaining the portable blower in operation during occupancy of the housing should be a requirement rather than a prerogative. The temporary blower also eliminates repairmen breathing an atmosphere having an odor of gas caused by condensates on the interior surfaces of the regulator. Condensate odors ordinarily would not affect a workman but the continuous breathing of such odors would result in a lowering of the susceptibility of the workman's olfactory nerves to the natural odor of manufactured gas. During occupancy of a pit ventilation is further increased by the use of a frame placed upright on the lee side of the manhole covered with a piece of canvas which would direct the natural air currents into the pit.

Ideas

Clarence T. Hubbard, Assistant Secretary of the Automobile Insurance Company of Hartford, at the recent meeting of the New York-New England Regional Gas Sales Conference, spoke on, "It's There If You Go After It."

Mr. Hubbard stated: "Ideas are the order of the day. Utility men in the gas distributing field, like industrialists, insurance people, and others, must be alert in watching for the magical effect of ideas, *not only in your own business*, but in the activities of others. Each year the competition for the dollar grows keener and keener. The consumers' dollar is invited in so many attractive ways. There are the *ideas* of taking a cruise, installing oil burners, insulating a home, acquiring a car without gear shifts, enjoying short wave radio sets, swapping the old lawn mower for a new, quiet rubber drive machine, purchasing a streamlined vacuum cleaner, putting up a prefabricated house as a vacation retreat, changing over to an electric razor.

"These are only a very few of the new ideas which are alluring to the dollar. Therefore, unless your product is likewise attractive in its presentation, its service, and its value, you are up against the tremendous competition of the accumulative ideas of others.

"Ideas change the entire business world. Consider cellophane. The talking picture put orchestras and organ players out of business. Television will work radical changes. Composition rubber almost ruined the leather business. Therefore, one of the most important activities in any industry, aside from research, is in the long range vision as to what *ideas* will do to the gas industry, both in the way of ideas developed by your competitors, in the heating and power business, as well as ideas by those in other activities, all of whom are after the same dollar.

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